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Sciences; Institute of Chemistry, ESSR Academy of Sciences]

[Abstract] Hormonal mechanisms of the formation of supplemental larval growth in *G. Mellonella* was studied along with the possibility of using its induction by juvenoids and ecdysterone as a bioassay for these agents. Larvae were grown at 30°C on standard diet and in darkness; 1-day-old larvae were treated topically with the test agents. Treatment with juvenoids produced perfect supernumerary larval moults accompanied by acceleration of moulting. Low doses failed to produce a morphologic effect leading to prolonged terminal larval instar. Within 3-20 hrs of the experiment larval-pupal intermediates were not produced even at higher doses. Treatment leading to development of perfect superlarva induced precocious moulting. Normally-fed perfect supernumerary instar larvae exhibited metamorphosis and produced pupae and adults. Production of perfect supernumerary larvae was dose and time dependent (3-30 hrs). Ecdysterone produced a juvenile hormone effect (30% effect with 0.01 µg dose and 90% effect with 1 µg dose. References 23: 3 Russian, 20 Western.

7813/13046
CSO: 1840/399

EFFECT OF PHYTOTOXIN CHAETOMIUM AUREUM 8583 ON PLANT CELLS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 4, Jul-Aug 85
(manuscript received 13 Feb 84) pp 26-29

[Article by I.Ya. Zakharova, Ye.V. Nadkernichnaya and S.P. Nadkernichnyy,
Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev;
Ukrainian Scientific Research Institute of Agricultural Microbiology,
Chernigov]

[Abstract] Toxic substances of phytopathogenic fungi are important in the pathogenesis of plant diseases. Phytotoxic substances of saprotrophic fungi may accumulate in the soil and have a toxic effect on plants. Chaetomium aureum 8583 was isolated by the authors from dern-podzolic soil planted in lupine and a substance was extracted from the culture fluid which was responsible for the phytotoxic activity of the fungus. This article discusses the changes developing in plant cells under the influence of this phytotoxic substance. Microscopic examination indicated the capability of this phytotoxin to cause disorders in the plant cell nucleus. Structural changes were observed in chromosomes--breaks and fragmentations. Chromosomal changes were observed in the anaphase of mitosis with the phytotoxin at concentrations of 5-10 µg/ml. Even at these low concentrations, the phytotoxin caused breaks in chromosomes and nonuniform distribution in the anaphase. At higher concentrations of 100 µg/ml, breaks and migration of chromosomes in the cytoplasm were observed. Plant cell structural disorders including changes in permeability of plasma-lemma, inhibition of mitotic cell division, development of structural changes in the chromosomes, vacuolization and lysis of cell nuclei caused suppression of growth and development of the plants. Figures 2; references 10: 7 Russian, 3 Western.

6508/13046
CSO: 1840/282

UDC 577.3

PREVENTION BY FUNGAL MELANINS OF PHOTODYNAMIC SPORE DAMAGE

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA in Russian No 4,
Jul-Aug 86 (manuscript received 7 Jun 84) pp 541-549

[Article by A.A. Averyanov, V.P. Lapikova, G.G. Petelina and V.G. Dzhavakhiya, All-union Scientific Research Institute of Phytopathology, USSR Ministry of Agriculture, Bolshyye Vyazemy, Moscow Oblast]

[Abstract] Normal melanin-producing Pyricularia oryzae spores and spores of alb-1 and ros-1 melanin-deficient mutants were evaluated for photodynamic damage following treatment with acridine orange or methylene blue. The rate of germination was evaluated after exposure to white light from a xenon lamp +

water filter to give an illumination level of 6.0-6.4 klux. The data demonstrated that melanin-deficient strains were far more susceptible to damage and, furthermore, treatment of the spores with fungal melanin restored some measure of resistance. The protective effects of melanin were attributed to its involvement in the neutralization of active oxygen. These observations also suggest that agents that are effective in inhibiting fungal synthesis of melanin may be effective fungicidal agents. Figures 1; references 26: 11 Russian, 15 Western.

12172/13046
CSO: 1840/418

UDC 633.17:632.4

OVERWINTERING CONDITIONS OF PATHOGEN OF RICE PIRICULARIOSIS IN PRIMORSKIY KRAY

Moscow IZVESTIYA TIMIRYAZEVSКОЙ SELSKOKHOZYAYSTVENNOY AKADEMII in Russian No 3, May-Jun 85 (manuscript received 24 Dec 84) pp 139-142

[Article by V.G. Anikeyev, Ya.P. Bunko, N.A. Tikhonova, O.A. Platonova and V.A. Shkalikov, Department of Phytopathology]

[Abstract] Results are presented from a study of the overwintering of fungus in infested rice residue following the harvest under the conditions in Primorskiy Kray, one of the northernmost rice-growing areas in the world at 42-49°N, 130-139°E. Experiments were performed in 1981-1983 in three rice-growing regions. The experiments indicated that the pathogen can overwinter in all of the regions studied, preserving good viability, better on nodules and heads than on leaves. Conidia on nodules and heads remained viable until the beginning of the next vegetation season in some cases. They are considered to be the primary sources of renewal of infection. The pathogen dies when plant residues are plowed under the soil to depths of 5 and 10 cm by the following April or May. By plowing immediately after harvest, the overwintering of the pathogen can be prevented. Figures 1; references 11: 4 Russian, 7 Western.

6508/13046
CSO: 1840/1033

INDUCTION OF GERMINATION OF RESTING SPORES OF ENTOMOPHTHORA TRAXTERIANA PETCH

Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 20, No 3, May-Jun 86
(manuscript received 30 May 85) pp 175-178

[Article by S.M. Ozerskaya, M.M. Skvortsova, G.A. Kochkina, T.N. Dryagina and Ye.V. Afonina, All-Union Scientific Research Institute of Microbiological Agents To Protect Plants and Bacterial Preparations, Moscow]

[Abstract] A study was conducted on the factors that may be used to assure more efficient germination of the resting spores of *Entomophthora traxteriana*, testing heating and moisture modalities. Short-term exposure of the spores to 45°C increased the rate of germination by 35-40%. However, exposure to 50°C for 5 min reduced germination to 40% of control level, and a 10 min exposure reduced it to 10-12% of the control figure. Concentration of the spore suspension was without telling effect on the rate of germination. Maintenance of the spores in aqueous suspensions at 20°C for 24-48 h improved the rate of germination 1.5- to 3.0-fold in all types of nutrient media. These observations demonstrated that manipulation of the temperature and moisture conditions of the resting spores may be used to enhance the rate of germination of *Entomophthora traxteriana* spores. Figures 1; references 5 (Russian).

12172/13046
CSO: 1840/364

UDC 632.4:633.11:582.285.2

METABOLIC CORRELATES OF STEM RUST VIRULENCE IN SUSCEPTIBLE WHEAT PLANTS:
ROLE OF ETHYLENE AND ABSCISIC ACID

Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 20, No 3, May-Jun 86
(manuscript received 26 Jul 85) pp 194-199

[Article by T.Ye. Zhigalkina and V.V. Chigrin, North Caucasus Scientific Research Institute of Phytopathology, Krasnodar]

[Abstract] Studies were conducted with susceptible and resistant wheat varieties to determine the role of ethylene and abscisic acid in the pathogenicity of the stem rust fungus *Puccinia graminis*. Prior to infection, the plants were treated with either agent, both of which are known to increase infection in the plants as a result. Pretreatment of the plants with ethylene or abscisic acid increased the number of pustules on the leaves 1.5- to 2.5-fold of susceptible Emmer wheat, and in the case of resistant Kapli [sic] wheat. In addition, treatment of the susceptible plants with ethylene and abscisic acid led to enhanced accumulation of plant levels of mono- and disaccharides, water-soluble polysaccharides, starch, hemicellulose, and cellulose within 2 days of infection (i.e., during the critical period).

Concomitantly, nitrite levels were depressed, while nitrate, amine nitrogen, amide nitrogen, NH_3 , and ATP levels were statistically elevated. However, the concentrations of ferulic acid and other phenol carboxylic acids--agents with fungistatic activities--were depressed. These observations point to the role of ethylene and abscisic acid in evoking metabolic changes in the host plant that potentiate virulence of stem rust. Figures 1; references 24: 29 Russian, 15 Western.

12172/13046

CSO: 1840/364

BIOCHEMISTRY

UDC 577.152.3

BACTERIOLYTIC ENZYMES OF LYSOAMIDASE PREPARATION ISOLATE FROM BACTERIA OF
PSEUDOMONADACEAE FAMILY

Moscow BIOKHIMIYA in Russian Vol 51, No 7, Jul 86 (manuscript received
28 Jun 85) pp 1117-1123

[Article by O.A. Stepnaya, A.I. Severin and I.S. Kulayev, Institute of
Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences,
Pushchino, Moscow Oblast]

[Abstract] Lytic enzymes of microorganisms are used in production of proto-
plasts, spheroplasts and genetic material from their cells. They have made
it possible to study cellular and genetic engineering in areas in which
traditional methods would not succeed. Some reports indicate the use of
bacteriolytic enzymes in treatment of various diseases caused by pathogenic
microorganisms. Bacteriolytic enzymes of the lysoamidase preparation were
isolated from culture liquid of bacterial strain IBFM CHL-1415, family Pseudo-
monadeae. A bacteriolytic fraction L₁ was obtained after ion-exchange
chromatography and gel filtration consisting of three components: proteinase
with no bacteriolytic activity and two lytic enzymes, one of which was
N-acetylmuramidase and the other, probably, a peptidase. These enzymes had
similar isoelectric points in the pH range of 8-9 and molecular weight of
15,000 Da. Figures 7; references 31: 9 Russian, 22 Western.

7813/13046
CSO: 1840/507

UDC 547.962.7

ISOLATION OF ω -GLIADINES USING THIOPROPYL-SEPHAROSE CHROMATOGRAPHY

Moscow BIOKHIMIYA in Russian Vol 51, No 7, Jul 86 (manuscript received
5 Jul 85) pp 1124-1131

[Article by T.I. Odintsova, Ts.A. Yegorov and A.A. Sozinov, Institute of
General Genetics imeni N.I. Vavilova, USSR Academy of Sciences, Moscow]

[Abstract] A method was developed for isolating ω -gliadines from a mixture
of alcohol-extracted proteins from wheat Bezostaya I flour using covalent

chromatography on thiopropyl-sepharose 6B. The following steps were involved: extraction with 70% ethanol, evaporation, reduction of proteins with 2-mercaptoethanol, desalting with biogel P4 and immobilization on thiopropyl-sepharose 6B from which centrifugation followed by dialysis and lyophilization of the mother liquor gave fraction 1, while washing with guanidine chloride, elution with 2-mercaptoethanol dialysis and lyophilization gave fraction 2. Fraction 1 contained ω -gliadines. This method showed advantages over gel filtration and ion exchange chromatography: isolation of the entire group of ω -gliadines free of admixtures, ability to work with microquantities, and, simplicity. The ω -gliadines obtained in this fashion were free of disulfide bands or free SH-groups. Figures 3; references 31: 4 Russian, 27 Western (1 by Russian authors).

7813/13046
CSO: 1840/507

UDC 577.152.1

STABILITY OF GLUCOSE-6-PHOSPHATEDEHYDROGENASE AND HORSERADISH PEROXIDASE IN
ENZYME-SURFACTANT-WATER-HEPTANE SYSTEMS SIMULATING LIPID-PROTEIN MEMBRANE
ENSEMBLES

Moscow BIOKHIMIYA in Russian Vol 51, No 10, Oct 86 (manuscript received
10 Nov 85) pp 1612-1623

[Article by A.N. Yeremin and D.I. Metelitsa, Institute of Bioorganic Chemistry,
BSSR Academy of Sciences, Minsk]

[Abstract] The goal of this work was a detailed kinetic study of the inactivation of glucose-6-phosphatedehydrogenase and horseradish peroxidase in reversed surfactant micelles in heptane and water solution after the loss of their catalytic activity at different temperatures, pH values, enzyme concentrations, etc. Stability of horseradish peroxidase in aerosol OT micelles (AOT) and those mixed with Triton X-45 was lower than in buffer solutions. Solubilization of dehydrogenase in these media assured its high temperature stability in comparison to buffer solution. Temperature dependence of the enzyme inactivation rate constants are complicated by breaks in Arrhenius plots resulting from transformations of microheterogeneous systems (protein-surfactant-water-heptane) due to increase in temperature. This phenomenon was analogous to the inactivation of proteins and enzymes in biological membranes. Another reason for these breaks may be the relationship of effective rate constants to concentration of dehydrogenase and peroxidase in reverse surfactant micelles. It was shown to be possible to stabilize proteins in reversed micelles by conscious variation of the composition of micelles and their properties. It is difficult to predict stability of enzymes in micelles because each case requires a specific microenvironment corresponding to properties of the protein globule surface. Figures 6; references 28: 23 Russian (1 by Western authors), 5 Western (2 by Russian authors).

7813/13046
CSO: 1840/510

STEADY STATE KINETICS OF CONJUGATED CYCLIC REACTION CHAINS

Moscow BIOKHIMIYA in Russian Vol 51, No 10, Oct 86 (manuscript received 31 Jan 86) pp 1741-1755

[Article by V.I. Zvalinskiy and F.F. Litvin, Institute of Marine Biology, Far Eastern Scientific Center, USSR Academy of Sciences, Vladivostok; Faculty of Biology, Moscow State University imeni M.V. Lomonosov]

[Abstract] Conjugated cyclic reactions form the basis for many biochemical functions of living organisms and cells. A generalized approach was presented to analysis of the steady state kinetics of a conjugated polycomponent cyclic process including linear and branched reaction chains, reactions forming loops and those with several substrates and products. A simple algorithm was found for graphic presentation of data and possible solution of even complex chains by biochemists without special mathematical skills using computers for quantitative calculations. Effects of the enzymatic cycles, their positions in various chains and inhibitions on the reaction course were taken into consideration. The curve obtained depended on a generalized equilibrium constant transformed to the Michaelis constant. Complex chains could be approximated by two cycles; the dependence of the reaction rate on the concentration of the substrate was expressed by a nonrectangular hyperbole. This approach should be useful in analyzing a wide spectrum of complex biochemical systems as well as other processes such as circulation of substances in ecological systems and other complex situations satisfying the initial conditions. Figures 4; references 14: 10 Russian (2 by Western authors), 4 Western.

7813/13046
CSO: 1840/510

UDC 615.33:547.152.321].012.015.46.07

STUDY OF IMMUNOLOGIC IDENTITY OF LYSOZYMES OF VARYING ORIGINS

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 30, No 8, Aug 85 (manuscript received 23 Jan 85) pp 598-600

[Article by V.M. Podboronov and V.A. Tsvetkov, Scientific Research Institute of Epidemiology and Microbiology imeni N.F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] Previous works by the same authors have reported liberation of lysozymes from various species of ticks. Antisera were obtained for lysozymes from *Ornithodoros moubata*, *O. papillipes*, *Alveonasus lahorensis*, *Hyalomma asiaticum*, and the immunologic identity of these lysozymes with egg lysozymes was studied by double diffusion in agar and enzyme-labeled antibodies. Partial antigen identity was established. References 9: 7 Russian, 2 Western.

6508/13046
CSO: 1840/290

PURIFICATION OF DNA-DEPENDENT RNA-POLYMERASE OF PLAGUE MICROBE AND SOME OF ITS PROPERTIES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 3, May-Jun 85
(manuscript received 2 Sep 83) pp 75-80

[Article by I.I. Kurennaya, B.N. Mishankin and G.T. Atarova, Rostov-on-Don Scientific Research Antiplague Institute]

[Abstract] The enzyme which supports reading of genetic information in the plague bacterial cell is a DNA-dependent RNA-polymerase, isolated and studied in a number of microorganisms. The absence of any information on the properties of the RNA polymerase of the plague pathogen stimulated the authors to isolate and purify the enzyme, study its subunit composition and relationship to inhibitors, as well as the matrix specificity of the purified preparation. The most characteristic property of the RNA-polymerase is its multiple-subunit composition. The optimal concentration of Mg^{2+} was found to be $8 \cdot 10^{-3}$ mol. Monovalent cations K^+ and NH_4^+ in the presence of bivalent ions stimulated the activity of the RNA-polymerase, the optimal concentration of K^+ being 0.25 mol, of NH_4^+ -- 0.2 mol. The best matrix for the RNA polymerase of the plague microbe is double-stranded DNA. Variations in effectiveness of reading by RNA-polymerase reflects the large number of promoter and promoterlike sectors for this enzyme on the matrix. A matrix concentration corresponding to saturation of all enzyme molecules would probably achieve identical degrees of transcription. Figures 5; references 9: 2 Russian, 7 Western.

6508/13046
CSO: 1840/281

UDC 579.861.2.222'19:5/8.282

INFLUENZA VIRUS NEURAMINIDASE INHIBITOR ISOLATED FROM STAPHYLOCOCCUS AUREUS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 3, May-Jun 85
(manuscript received 28 Sep 83) pp 84-87

[Article by L.D. Varbanets, I.Ya. Zakharova, A.F. Frolov, S.L. Rybalko and A.V. Shapiro, Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev; Kiev Scientific Research Institute of Epidemiology and Infectious Diseases]

[Abstract] Influenza virus neuraminidase participates in splitting of neuraminic acid groups from cell membranes and mucin layers, disaggregation of viral particles possibly preventing adsorption of virions on mucins, doubtless quite important in influenza pathogenesis. Neuraminidase inhibitors are therefore quite interesting to investigators. Recent articles have reported isolation of neuraminidase inhibitors of microbial origin, glycoprotein substances. The authors isolated a neuraminidase inhibitor from

staphylococcus aureus culture fluid. The task of the present work was to purify the inhibitor and study its chemical nature and composition. Purification was performed by gel filtration on a column with sepharose 4B and ultracentrifugation at 144,400 G 4 hours. Comparative analysis of the inhibitor from staphylococcus aureus and an inhibitor isolated from streptomycete indicates that the main neutral monosaccharides are mannose and glucose. Sialic acids were not found in either. The inhibitors differ in amino acid composition: The inhibitor from staphylococcus does not contain arginine but does contain methionine. The basic difference is that the inhibitor from the streptomycete is a glycoprotein, whereas that from staphylococcus contains fatty acids as well as protein and carbohydrates. Figures 4; references 7: 3 Russian, 4 Western.

6508/13046

CSO: 1840/281

UDC 579.842.23.22

QUANTITATIVE DETERMINATION OF DETERMINANT GROUPS IN SPECIFIC POLYSACCHARIDE FROM YERSINIA PSEUDOTUBERCULOSIS (SEROVAR I B)

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 4, Jul-Aug 85
(manuscript received 14 Dec 83) pp 66-70

[Article by T.F. Solovyeva, G.M. Frolova, O.P. Sanina and Yu.S. Ovodov,
Pacific Ocean Institute of Bioorganic Chemistry, Far Eastern Science Center,
USSR Academy of Sciences, Vladivostok]

[Abstract] Lipopolysaccharide-protein complexes in external membrane of gram-negative bacteria have high biological activity. They are endotoxins and O-antigens of gram-negative bacteria. This article deals with defining the number of determinant groups in the specific polysaccharide of Yersinia pseudotuberculosis serovar I B. The polysaccharide is known to consist of regularly-repeating pentasaccharide groups. Its structure is illustrated. The specific polysaccharide was obtained by mild acid hydrolysis of the lipopolysaccharide with subsequent gel chromatography of the carbohydrate fraction on Sephadex G-50. The molecular weight of the specific polysaccharide was found to be 22,400. The number of antigen determinants was determined by the Cabot method. The molar ratio of antigen and antibody in a precipitate in the zone of equivalence is 1:22, indicating 22 or 44 determinant groups in the molecule of the specific polysaccharide. Considering other data it is assumed that there are 22 determinant groups in the specific polysaccharide. Figures 2; references 17: 6 Russian, 11 Western.

6508/13046

CSO: 1840/282

GALTAMYCIN ANTIBIOTIC: FERMENTATION, ISOLATION, PHYSICAL-CHEMICAL AND BIOLOGICAL PROPERTIES

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 31, No 6, Jun 86 (manuscript received 12 May 85) pp 428-431

[Article by T.P. Korobkova, E.M. Singal, L.P. Ivanitskaya, M.K. Kudinova, V.D. Karbyshev, N.V. Murenets, N.A. Klyuyev, T.G. Terenteva, N.A. Rudneva, A.N. Dmitriyev and L.V. Yegorov, All-Union Scientific Research Institute of Antibiotics, Moscow; Institute of Geology and Geophysics, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] Information is presented on the fermentation, isolation, physical-chemical and biological properties of galtamycin. Galtamycin is a dark-red crystalline substance with a melting point of 205-208°C, insoluble in water, moderately soluble in aromatic hydrocarbons, soluble in DMSO, DMFA, methanol, acetone, ethyl acetate and chloroform. UV spectral, mass spectral and NMR spectral data are presented. The cytotoxic effect of galtamycin in a system of HeLa tumor cells in vitro was weak, reliable cell growth suppression occurring at 100 µg/ml. The preparation was found to have a clear effect on Erhlich carcinoma upon administration of the maximum tolerable dose: 100% inhibition of development of ascities. Figures 2; references 3 (Western).

6508/13046

CSO: 1840/332

GALTAMYCIN ANTIBIOTIC. STRUCTURE OF GALTAMYCINONE

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 31, No 6, Jun 86 (manuscript received 12 May 85) pp 431-434

[Article by N.V. Murenets, M.K. Kudinova, N.A. Klyuyev, A.I. Chernyshev and S.V. Shorshnev, All-Union Scientific Research Institute of Antibiotics, Moscow]

[Abstract] The authors previously established that acid hydrolysis of galtamycin formed the chromophore galtamycinone and 3 unidentified sugars. In this article, they establish the structure of the chromophore fragment, a dark red crystalline substance, melting point 282-283°C, insoluble in water, slightly soluble in acetone and ethyl acetate, soluble in DMSO, DMFA and methanol. PMR, UV and NMR spectral data are presented. The structure is 1,4,6-trioxy-10[4(e), 5(e)-dioxo-6(e)-methyl-tetrahydropyrane-2(e)-yl]-8-methyl-tetracendion-5, 12. It is a representative of a new type of anthracycline chromophore, among which C-glycosides were not previously known. References 4 (Western).

6508/13046

CSO: 1840/332

INTERACTION OF cAMP-DEPENDENT PROTEIN KINASE SUBUNITS AND STRUCTURAL COMPONENTS OF NUCLEUS

Moscow BIOKHIMIYA in Russian Vol 51, No 1, Jan 86 (manuscript received 6 May 85) pp 103-111

[Article by A.I. Glukhov, M.V. Nesterova, V.L. Bukhman and Ye.S. Severin, Department of Biochemistry, Biological Faculty, Moscow State University imeni M.V. Lomonosov; Institute of Molecular Biology, USSR Academy of Sciences, Moscow; Institute of Molecular Genetics, USSR Academy of Sciences, Moscow]

[Abstract] Filtration of a DNA protein complex through a nitrocellulose filter was used to study the possibility of direct interaction of the regulatory subunit of protein kinase from swine brain and [^{32}P] DNA EcoRI. The regulatory subunit did not interact with DNA. The catalytic subunit may interact directly with DNA and this may be a definite mechanism of regulation of the transcription process. Study of the interaction of the regulatory subunit and nuclear proteins was carried out by transferring the nuclear proteins from polyacrylamide gel to a nitrocellulose filter and incubation with a ^{125}I -labeled regulatory subunit. The subunit can interact with some chromatin proteins, especially histone H1 and core histones, with formation of a firm bond. Hydrophobic and electrostatic interactions predominated in this bonding. Figures 6; references 23: 1 Russian, 22 Western.

2791/13046
CSO: 1840/235

pH-DEPENDENT BIOLUMINESCENCE SPECTRA AND KINETIC CONSTANTS OF LUCIFERASE OF LUCIOLA MINGRELICA FIREFLIES

Moscow BIOKHIMIYA in Russian Vol 51, No 1, Jan 86 (manuscript received 7 Jun 85) pp 130-139

[Article by Ye.I. Dementeva, L.Yu. Brovko, Ye.N. Gandelman, O.A. Druzhinina and N.N. Ugarova, Chemistry Faculty, Moscow State University imeni M.V. Lomonosov]

[Abstract] Establishment of the pH dependence of kinetic constants and bioluminescence spectra in a wide range of pH and more precise definition of the role of acid-base properties of protein in the observed pH-dependence of activity of luciferase of fireflies (*Luciola mingrellica*) are described and discussed. It was found that the pH dependence observed is due to two factors: the acid-base properties of the protein (pK values of ionogenic protein groups are 7.6 and 8.0) and properties of the irradiating particles-oxyluciferin. Decrease of bioluminescence intensity was associated with protonation and deprotonation of ionogenic protein groups at pH < 7.7 and

pH > 7.9 and with the decrease of quantum yield of the bioluminescence reaction at pH < 7.7. Decrease of quantum yield and shift of the bioluminescence spectrum in the long-wave region was attributed to properties of the irradiating particle. Figures 6; references 15: 7 Russian, 8 Western.

2791/13046
CSO: 1840/235

UDC 577.152.3

APURINIC-APYRIMIDINIC DNA-ENDONUCLEASE ACTIVITY OF CYTOCHROME c AND PANCREATIC RNAase

Moscow BIOKHIMIYA in Russian Vol 51, No 1, Jan 86 (manuscript received 12 Jun 85) pp 146-149

[Article by O.K. Kaboyev, L.A. Luchkina and M.L. Bekker, Leningrad Institute of Nuclear Physics imeni B.P. Konstantinov, USSR Academy of Sciences]

[Abstract] The capacity of cytochrome c and pancreatic RNAase to catalyze a DNA break in the region of apurinic-apyrimidinic sites is described and discussed and the characteristics of the reaction described. These cationic proteins displayed pronounced apurinic-apyrimidinic activity. The affinity of these proteins for apurinic sites in DNA was practically the same as that of commonly-known specific apurinic-apyrimidinic endonucleases. Major features of apurinic activity of cytochrome c and RNAase included the absence of primer-activated activity, high temperature optimum of the reaction and low specific activity. The possible role of apurinic-apyrimidinic activity of cationic proteins and some other nucleophilic agents in the formation of single-strand breaks in DNA containing apurinic-apyrimidinic sites is discussed. Figures 4; references 13: 2 Russian, 11 Western.

2791/13046
CSO: 1840/235

UDC 612.824.1.014.462.46:615.356:577.164.11

ALTERING PERMEABILITY OF BLOOD-BRAIN BARRIER TO HYDROXYTHIAMINE

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian No 5, Sep-Oct 85 (manuscript received 27 Jul 84) pp 119-121

[Article by Yu.M. Ostrovskiy, T.I. Zimatkina and D.A. Oparin, Department of Regulation of Metabolism, Belorussian SSR Academy of Sciences, Grodno]

[Abstract] Trials were conducted with two agents, 3-(2,2-dichlorodiethyl)-aminopropionic acid (I) and (3,3-dimethyl-1-phenyl-1-phthalyl)acetic acid (II), to test their efficiency in altering the permeability of the blood-brain barrier for the vitamin antagonist hydroxythiamine. Studies on albino

male mice (18-20 g) demonstrated that subcutaneous injection of an equimolar mixture (0.3 mmoles/kg) led to a statistically significant ($P < 0.05$) depression of brain transketolase activity, with an even more pronounced depression ($P < 0.001$) seen with the same dose of hydroxythiamine-I ester. However, depression of brain transketolase was always much more pronounced ($P < 0.001$) either with an equimolar mixture (0.3 mmoles/kg hydroxythiamine, and 0.15-0.45 mmoles/kg of II) or the hydroxythiamine-II ester. Injection of hydroxythiamine alone was ineffective in terms of brain transketolase activity due to impermeability of the blood-brain barrier. These observations indicate that the blood-brain barrier may be altered sufficiently by other bioactive molecules to enhance its permeability to hydroxythiamine, a fact to be considered in research studies and use of this vitamin antagonist. References 9: 5 Russian, 4 Western.

12172/13046
CSO: 1840/1008

UDC 547.814

^{13}C -NMR AND PMR-SPECTROSCOPIC STUDY OF 7-AMINOCOUMARINS

MOSCOW IZVESTIYA TIMIRYAEVSKOY SELSKOKHOZYAYSTVENNOY AKADEMII in Russian
No 3, May-Jun 85 (manuscript received 21 Dec 84) pp 172-178

[Article by M.A. Kirpichenok, I.I. Grandberg, L.K. Denisov and L.M. Melnikova,
Department of Organic Chemistry]

[Abstract] Information is presented on ^{13}C -NMR and PMR-spectra of 10 substituted 7-aminocoumarins, the most important dyes available for lasers with discontinuous spectra. Analysis of the spectra indicates that the chemical shifts of protons in the coumarin fragment are sufficiently characteristic for interpretation. Data on NMR spectra of substituents present in the compounds were not analyzed, though tables in the article present sufficient initial information for this analysis. References 14: 2 Russian, 12 Western.

6508/13046
CSO: 1840/1033

BIOPHYSICS

ABSENCE OF CHANNELS IN RECEPTOR MEMBRANE OF RODS

Moscow BIOFIZIKA in Russian Vol 31, No 6, Nov-Dec 86 (manuscript received 19 Dec 85) pp 985-989

[Article by T.I. Rebrik, G.R. Kalamkarov and M.A. Ostrovskiy, Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] A comparative electrophysiological study was conducted on the photoreceptor and plasma membrane of bovine rod preparations and intact frog retinas by insertion of disks and outer rod segments into lipid-saturated membrane filters and determination of change in potential. The electrical resistance of the photoreceptor disk membrane was found to be on the order of 1-2 Mohm·cm², a value some three orders of magnitude greater than that of the plasma membrane (1-2 kohm·cm²). These measurements, therefore, provided indirect evidence for the absence of ion channels in the photoreceptor disk membrane. The absence of such channels may suggest that the function of rhodopsin involves activation of perimembranous proteins. Figures 3; references 12: 3 Russian, 9 Western.

12172/13046

CSO: 1840/433

UDC 577.3

GAMMA-RESONANCE SPECTROSCOPIC STUDY ON BINDING OF IRON IONS BY OMMOCHROME OF INVERTEBRATE EYES

Moscow BIOFIZIKA in Russian Vol 31, No 6, Nov-Dec 86 (manuscript received 21 Nov 85) pp 1017-1022

[Article by R.M. Bagirov, R.A. Stukan, A.Ye. Dontsov, M.A. Ostrovskiy and V.A. Lapina, Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] Gamma-resonance spectroscopy was employed as the technique of choice to assess the binding of Fe ions by ommochromes isolated from krill eyes. Under the conditions employed, binding was rapid and complete within 5 min, with the formation of the Fe²⁺-ommochrome complex accompanied by a sharp decrease in the redox potential and oxidation of the complexes to the

Fe^{3+} state. The Fe^{3+} complexes form polynuclear clusters with $n > 2$, with the Fe ion coordinated by carboxyl, amino and imino groups of the ommochrome. The efficient binding of Fe^{2+} may be an important mechanism for the prevention of lipid peroxidation, and imparts to the ommochromes a protective function both under conditions of illumination and in the dark. Figures 3; references 16: 10 Russian, 6 Western.

12172/13046
CSO: 1840/433

METABOLIC TRANSFORMATION OF FERROMAGNETIC SUSPENSIONS IN ANIMALS

Moscow BIOFIZIKA in Russian Vol 31, No 6, Nov-Dec 86 (manuscript received 19 Mar 85) pp 1023-1026

[Article by A.I. Tsapin, S.D. Dvukhshestnov, A.G. Malenkov and A.F. Vanin, Institute of Chemical Physics, USSR Academy of Sciences, Moscow; Scientific Research Institute for Biological Testing of Chemical Compounds, Kupavna, Moscow Oblast]

[Abstract] Studies were conducted on the metabolic transformation and distribution of ferromagnetic suspensions introduced into outbred mice (20 g) and rats (160 g) via i.p., i.m. or i.v. routes. The average particle size of the suspension at time of administration was ca. 2 μm , with the dosages ranging from 50 to 100 mg/mouse and from 0.2 to 1 g/rat. Low-temperature (80-250 K) ESR monitoring demonstrated relatively rapid localization in the spleen, liver and the lungs, with the concentration in the spleen predominating. The localization and distribution patterns were due to uptake by the RES. After 20 days biotransformation was largely intracellular, involving solubilization and transformation of the ferromagnetic phase into anti-ferromagnetic. After 2 years, the Fe levels in all the organs and tissues were at baseline control values, with the exception of the spleen where the concentration was 2- to 3-fold higher than baseline. On the whole, the study demonstrated that administration of even massive doses of ferromagnetic suspensions was without significant long-term effects. Figures 2; references 13: 4 Russian, 9 Western.

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SURFACE ENHANCED RAMAN SPECTROSCOPY OF BIOPOLYMERS: WATER SOLUBLE PROTEINS, AMINO ACIDS AND DIPEPTIDES ADSORBED ON SILVER ELECTRODES AND SILVER HYDROSOLS

Moscow BIOFIZIKA in Russian Vol 31, No 2, Mar-Apr 86 (manuscript received 17 Jun 85) pp 183-190

[Article by I.R. Nabiyeu and G.D. Chumanov, Institute of Bioorganic Chemistry imeni M.M. Shemyakin, USSR Academy of Sciences, Moscow; Moscow Engineering Physics Institute]

[Abstract] Studies have appeared in recent years dealing with application of surface enhanced Raman spectroscopy (SERS) to investigations of the conformation of biomolecules and to kinetics of their behavior at the interface of two media. The SERS effect was used to study topography of the membrane proteins, bacteriorhodopsin and rhodopsin, adsorbed on silver electrodes and silver hydrosols. Adsorption on silver does not affect the conformation of proteins and polypeptides. In this work, SERS of water-soluble proteins adsorbed on silver electrode was analyzed and compared with spectra of amino acids and dipeptides; finally, the mechanism of the SERS effect, important in interpretation of the observed spectra, was reviewed. Spectra of the following compounds were reproduced and analyzed: sodium acetate, L-tyrosine, L-tryptophan, L-phenylalanine, Gly-Phe and Phe-Val dipeptides, lysozyme and bovine serum albumin. The enhancement factor can reach values of 10^5 to 10^6 , depending on the oscillation frequency of the bond. This enhancement is due to chemisorption of the molecules on a metal surface and to formation of a charge transfer bond superimposed on excitation of metal plasmonic oscillations of adsorbed molecules. Figures 6; references 23; 6 Russian (1 by Western authors), 18 Western (3 by Russian authors).

7813/13046
CSO: 1840/425

SIMPLEST OPEN ENZYMIC PROCESSES WITH POSSIBLE DAMPING OSCILLATIONS AND RESONANCE

Moscow BIOFIZIKA in Russian Vol 31, No 2, Mar-Apr 86 (manuscript received 4 Feb 85; after revision 28 May 85) pp 204-207

[Article by N.P. Kaymachnikov, Institute of Biological Physics, USSR Academy of Sciences, Pushchino, Moscow Oblast]

[Abstract] An attempt was made to show in which non-autovibrational enzymic processes, described by second degree models, are damping oscillations and resonance possible. They are possible in a variety of enzymatic processes with two essential variables: concentrations of metabolites and enzymes and are due to reciprocal effects of each substance on the accumulation rate of its partner and approximately equal effects on their own accumulation rate. Two groups of biochemical schemes are reported but, although they are principal schemes, they are shown not to be unique. Each scheme has equivalent

variants which could be found by introduction of a new variable, linearly-tied to the old variable. These concepts of opposition of cross effects, and quantitative similarity of effects on itself, may serve as an approximation in a search for or removal of a regimen of generation of dampening oscillations and resonance response under conditions of inadequate learning of the exponential system which does not allow construction of an accurate mathematical model. Figures 2; references 12: 7 Russian, 5 Western (2 by Russian authors).

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PERMEABILITY OF BILAYER LIPID MEMBRANE AT PHASE TRANSITION. SIGNIFICANCE OF INTERMOLECULAR CALCIUM BRIDGE

Moscow BIOFIZIKA in Russian Vol 31, No 2, Mar-Apr 86 (manuscript received 31 Oct 84; after revision 10 Jan 85) pp 252-255

[Article by V.F. Antonov, E.T. Kozhomkulov, Ye.V. Shevchenko, A.N. Vasserman, Ye.Yu. Smirnova, S.A. Voznesenskiy and Yu.V. Morozov, First Moscow Medical Institute imeni I.M. Sechenov]

[Abstract] One of the possible molecular mechanisms of the formation of ion channels is phase transition of membrane lipids. In the present work, phase transitions were studied on individual bimolecular lipid membranes (BLM) from synthetic phosphatidyl acid 1,2-dipalmitoyl-sn-glycero-3-phosphate (2% solution of acid in a 7:2:1 mixture of decane:chloroform:methanol). This approach made it possible to control physical-chemical parameters of lipid bilayer during the experiment. At constant pH, calcium ions shifted the temperature of phase transition (T_{pt}) in BLM towards higher temperatures: changing $-\lg[Ca^{++}]$ from 3 to 2 led to T_{pt} of 30°C/pCa unit. Experimental results showed good agreement with theoretically-calculated values, leading the authors to a conclusion about possible mechanism of the interaction of Ca^{++} with lipid bilayer: T_{pt} change was observed in the flat lipid bilayer and not in liposome suspension, therefore statements--about changes of dielectric constant in vesicle contact being the reason for the T_{pt} change--were questionable. Ca^{++} ions regulating phase transition of acid lipids in membrane may also regulate ion permeability of membranes through channels appearing in the membrane during phase transition. Figures 2; references 12: 8 Russian, 4 Western (1 by Russian authors).

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MICROCALORIMETRIC STUDY OF ONCOGENE EJ AND PROTOONCOGENE EC IN COMPOSITION OF PLASMID pBR 322

Moscow BIOFIZIKA in Russian Vol 31, No 2, Mar-Apr 86 (manuscript received 8 Apr 85) pp 256-259

[Article by E.L. Andronikashvili, D.R. Monaselidze, Z.I. Chanchalashvili, E.M. Lomidze and Ye.M. Lukanidin, Institute of Physics, GSSR Academy of Sciences, Tbilisi; Institute of Molecular Biology, USSR Academy of Sciences, Moscow]

[Abstract] Oncogene EJ and protooncogene EC contained in linearized plasmid pBR 322 were studied by means of differential scanning microcalorimetry (DSM) examining the fine structural changes during conversion of protooncogen to oncogen. It was assumed that high sensitivity of DSM combined with its temperature-related resolution power will make it possible to observe gene ras melting stage containing point mutation of this type (EJ) and to differentiate this stage from the melting of DNA fragment without mutation (EC). It was shown that the melting temperature of the main stage of heat absorption of oncogene EJ was 1.6°C below that of the standard (EC). An assumption was expressed that this observed change in thermal stability is related to point mutations of high melting base pairs of the oncogene and structural changes in the DNA double helix. Figures 2; references 17: 7 Russian, 10 Western (3 by Russian authors).

7813/13046

CSO: 1840/425

ROLE OF ELECTROCHEMICAL AND REACTION-DIFFUSIONAL SYSTEM INTRANEURON INFORMATION PROCESSING IN BRAIN FUNCTION

Moscow BIOFIZIKA in Russian Vol 31, No 2, Mar-Apr 86 (manuscript received 13 Mar 84) pp 298-303

[Article by Ye.A. Liberman, S.V. Minina and N.Ye. Shklovskiy-Kordi, Institute of Information Transmission Problems, USSR Academy of Sciences, Moscow]

[Abstract] Upon intracellular administration, cyclic nucleotides are capable of controlling penetrability of neuron membranes. Hypotheses on intraneuronal signal and information processing mechanism are reviewed along with their role in brain functions. On their basis, a hypothesis is proposed according to which an interneuronal system, controlling cyclic nucleotides and altering membrane permeability during development of generating potential, acts as a limiting molecular regulator in which the action per single operation approaches physical limits. Such an electrochemical analog system is capable of solving multiparameter physical tasks by means of molecular "digital" supersonic holograms encoded in DNA's molecular text, which is an image of target search function. Reported data provide a serious basis for the above hypotheses about the performance of intraneuronal system of information

processing. Figures 2; references 31: 18 Russian (3 by Western authors), 13 Western (2 by Russian authors).

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CSO: 1840/425

PHOTOTROPHIC PROPERTIES OF HETEROTROPHIC MICROORGANISMS IN MEDIUM CONTAINING PURPLE MEMBRANES

Moscow BIOFIZIKA in Russian Vol 31, No 3, May-Jun 86 (manuscript received 1 Aug 84) pp 437-439

[Article by N.N. Vsevolodov, S.M. Gaynullina and L.N. Chekulayeva, Institute of Biological Physics, USSR Academy of Sciences, Pushchino (Moscow Oblast)]

[Abstract] A new electrochemical potential generator was recently discovered, the purple membrane, a fragment of the cell membranes of certain halophilic organisms. When they absorb light, these membranes perform light-dependent transport of protons against the pH gradient. This work shows that heterotrophic microorganisms *E. coli* and *B. subtilis* have phototrophic properties in mineral media not containing organic nutrients with certain concentrations of purple membrane fragments. The purple membranes were extracted from *Hal. halobium*. Centrifugation and electronmicroscopy of the mixtures showed that the purple membrane contacted the bacterial cell membranes, though no precise concept of the mechanism of utilization of light energy in the cells of heterotrophic microorganisms in the medium with the purple membranes was developed. References 8: 3 Russian, 5 Western.

6508/13046
CSO: 1840/427

HOLE-BURNING SPECTROSCOPY OF REACTION CENTERS OF PHOTOSYNTHETIC BACTERIA RHODOPSEUDOMONAS SPHAEROIDES R-26

Moscow BIOFIZIKA in Russian Vol 31, No 3, May-Jun 86 (manuscript received 27 Jun 85) pp 440-443

[Article by A.O. Ganago, A.N. Melkozernov and V.A. Shuvalov, Institute of Soil Science and Photosynthesis, USSR Academy of Sciences, Pushchino (Moscow Oblast)]

[Abstract] Hole burning has been observed in many organic molecules, including photosynthetic systems. Data on hole burning in pure reaction centers are not available in the literature. Previous studies of magnetic resonance recorded by absorption methods have shown the complex structure of the absorption band of bacteriochlorophyll ($BChl$)₂ at 860-910 nm upon photo-oxidation of reaction centers. This article studies the possibility of

eliminating heterogeneous expansion in reaction center absorption spectra from photosynthetic bacteria, particularly in the absorption band of the dimer (BChl)₂. Reaction centers from rhodospseudomonas sphaeroides strain R-26 were frozen in an optical cuvette 1.5 mm thick and 60% glycerin was added. The specimens were immersed in liquid helium and evacuated to reduce the temperature to 2 K. Ruby laser pulses about 30 ns in length were used for selective excitation of the reaction centers. A narrow band was found, corresponding in position to the excitation wavelength, corresponding to appearance of a hole in the contour of the wide absorption band of the reaction center. The amplitude of the hole was not measured. The calculated hole width is an order of magnitude greater than in more complex photosynthetic systems containing large quantities of photochemically inactive chlorophyll molecules. Figures 3; references 6: 3 Russian, 3 Western.

6508/13046

CSO: 1840/427

GAMMA RESONANCE SPECTROSCOPY OF BONDING OF IRON IONS BY MELANOPROTEIN GRANULES OF OPHTHALMIC PIGMENT EPITHELIUM

Moscow BIOFIZIKA in Russian Vol 31, No 3, May-Jun 86 (manuscript received 3 Jun 85) pp 469-474

[Article by R.M. Bagirov, R.A. Stukan, A.Ye. Dontsov, M.A. Ostrovskiy and V.A. Lapina, Institute of Chemical Physics, USSR Academy of Sciences, Moscow]

[Abstract] Melanoprotein granules provide antioxidant protection, inhibiting peroxide oxidation of lipids, possibly by the capability of melanin to bond Fe²⁺ ions. This article uses gamma-resonance spectroscopy to study the interaction of Fe²⁺ ions with melanoprotein granules. The melanoprotein granule-iron ion mixture was precipitated by centrifugation and washed with distilled water. Studies were performed on moist fast-frozen precipitates without preliminary drying. The sediment was found to have a complex gamma resonance spectrum, consisting of at least four partial spectra, particularly a narrow doublet with parameters characteristic of paramagnetic Fe³⁺ complexes. A less intensive doublet had parameters characteristic of Fe²⁺ complexes. Oxidation of Fe²⁺ to Fe³⁺ primarily occurs during the first 5 minutes of exposure. Melanoprotein granules are capable of forming complexes with iron in both bivalent and trivalent states, oxidizing the Fe²⁺ ions to the trivalent state. The activity of the process increases with increasing illumination. Figures 2; references 11: 7 Russian, 4 Western.

6508/13046

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ELECTRICAL PROPERTIES OF HORNY LAYER OF HUMAN EPIDERMIS AND WATER TRANSPORT WITHIN IT

Moscow BIOFIZIKA in Russian Vol 31, No 3, May-Jun 86 (manuscript received 26 Nov 84; after revision 29 Feb 85) pp 478-481

[Article by R.F. Musin, V.A. Morozov, E.E. Godik and Yu.V. Gulyayev, Institute of Radio Engineering and Electronics, USSR Academy of Sciences, Moscow]

[Abstract] The purpose of this work was an experimental study of the influence of water transport through the horny layer of the epidermis (cuticle) on transverse electrical resistance of the cuticle. Studies were performed by measurement of weak current upon application of DC voltage to the epidermis using a flat, dry silver chloride electrode with a cross section of about 1 cm^2 held to the back of the hand by a small fixed pressure applied with a spring, assuring good reproducibility of the results. The data indicate that the transverse resistance of the cuticle is determined by its water content. Studies of the electrical properties of the cuticle therefore represent an effective method of studying water transport through the cuticle during the process of unperceived perspiration. Figures 1; references 5 (Russian).

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ONE POSSIBLE MODE OF BURST ACTIVITY IN HODGKIN-HUXLEY MODEL

Moscow BIOFIZIKA in Russian Vol 31, No 3, May-Jun 86 (manuscript received 19 Apr 84; after revision 24 Dec 84) pp 498-502

[Article by Yu.S. Chertkov, Scientific Research Institute of Applied Mathematics and Cybernetics, Gorkiy State University imeni N.I. Lobachevskiy]

[Abstract] The spontaneous, endogenous nature of the rhythmic activity of pacemaker neurons allows the types of their discharges to be interpreted as self-oscillating processes arising in a dynamic system. This article describes one possible mechanism of development of such a self-oscillating process equivalent to the burst activity mode in the Hodgkin-Huxley model. Figures 3; references 14: 11 Russian, 3 Western.

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INFLUENCE OF COTRANSFORMATION ON GROWTH RATE OF YEAST AND EXPRESSION OF β -LACTAMASE GENE OF ESCHERICHIA COLI

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85
(manuscript received 19 Oct 83) pp 37-42

[Article by V.S. Kirillova, L.I. Likhacheva, L.G. Zharova and V.A. Kordyum,
Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] A system of yeast DNA transformation developed in recent years has opened a new approach to the study of functioning of foreign genetic material in eucaryotic cells. Cotransformants have been obtained on expression in yeast not only of yeast genes, but also of foreign genetic material such as bacterial genes, mammal and human genes. No functional expression has yet been achieved of nitrogen fixation cluster genes. This article discusses the possibility of cotransformation, introduction to cells of two or more genetically different recombinant molecules. The possibility of cotransformation of two plasmids by yeast was demonstrated previously, but has apparently not been used to study the level of expression of foreign genes in yeast or the possible influence of introduced plasmids on cell metabolism. This article presents a comparative analysis of the level of expression of β -lactamase bacterial genes and morphologic-physiologic peculiarities of yeasts transformed by one or two plasmids simultaneously. Cotransformation was found to lead to intensification of the metabolism of the cotransformants in comparison to transformants, manifested as a significant increase in overall growth rate, a reduction in the time of biomass increase, as well as more active expression of β -lactamase E. coli genes. The same approach could obviously be used to study the expression of other foreign genetic material. Figures 3; references 14: 1 Russian, 13 Western.

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VLADIPORE POLYMER MEMBRANES FOR MICROFILTRATION OF DRUG SOLUTIONS. VLADIPORE MFA-A MICROFILTERS FOR AQUEOUS SOLUTIONS

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 31, No 7, Jul 86 (manuscript received 15 Aug 85) pp 527-532

[Article by L.A. Moiseyenko, S.A. Zhukovskaya, L.N. Shkatova, S.M. Chaikovskaya, A.S. Tikhonova, S.V. Shilova and S.M. Navashin, All-Union Scientific Research Institute of Antibiotics, Moscow]

[Abstract] The All-Union Scientific Research Institute of Antibiotics (ASRIA) has undertaken studies of the properties of membrane microfiltration materials from cellulose acetates and hydrates developed at the All-Union Scientific Research Institute of Synthetic Resins (ASRISR). The purpose of these studies is the creation and production of membranes for microfiltration of fluids in the production of medicines. Manufacture of experimental batches of membranes has been undertaken by the ASRISR, the evaluation as filtration materials for sterilizing and fine filtration of fluids by the ASRIA. Studies of the membranes have shown that when membrane specimens were exposed in water and lower alcohols for 72 hours, no significant changes in their characteristics occurred with the exception of the external appearance of the membrane. The presence of organic solvents such as esters or ketones results in breakdown of the membrane material. Following sterilization, there are deep changes in the material structure resulting in both contacting and closure of small and formation of many larger pores. The batch of membranes most recently produced is closer to the requirements of technology than vladipore MFA membranes previously made. Work to improve membrane properties and to develop techniques for their manufacture is continuing. References 21: 9 Russian, 12 Western.

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UDC 615.339:578.245].012.8+615.339:578.245].07

ISOLATION AND PROPERTIES OF HUMAN LEUKOCYTIC INTERFERON OBTAINED BY MICROBIAL SYNTHESIS

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 31, No 1, Jan 86 (manuscript received 6 May 85) pp 19-23

[Article by S.V. Kostrov, L.S. Izotova, S.I. Borukhov, A.S. Ryzhavskaya, A.A. Musatova, T.V. Chernovskaya, M.R. Yeremashvili and A.Ya. Strongin, All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow]

[Abstract] Medicinal preparations based on interferon are potentially effective means for the treatment of certain malignant neoplasms and autoimmune

disease. This article utilizes microbial producing strains carrying the full structural gene for human leukocytic interferon α_2 on the plasmid vector. The purpose of the work was to produce and describe highly purified INF α_2 preparations capable of serving as a basis for the creation of medicines. The INF α_2 preparations obtained by microbial synthesis are of particular interest due to their possible clinical applications. A simple and effective methodology of purifying INF α_2 from various bacterial producing strains has now been developed, based on the stability of the interferon at low values of pH, its comparatively low molecular weight and high hydrophobicity. In the first stages, the interferon is extracted from the biomass of the producing strain, or the bacterial cells are broken down by standard methods and interferon is fractionated from the extract by precipitation with ammonium sulfate. After this, the interferon is purified by adsorption chromatography and immune affinity chromatography on immobilized monoclonal antibodies. The purification procedure includes just two chromatographic stages and is therefore comparatively easy to scale up. The preparations obtained after purification are homogeneous according to electrophoresis in polyacrylamide gel in the presence of sodium dodecyl sulfate. Figures 3; references 10: 2 Russian, 8 Western.

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CSO: 1840/329

UDC 616-006-008.939.624-097:578.833.27]-092.9

MONOCLONAL ANTIBODIES TO JAPANESE ENCEPHALITIS VIRUS IN ASCITIC HYBRIDOMA PREPARATIONS

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 31, No 1, Jan 86 (manuscript received 21 May 85) pp 24-28

[Article by P.G. Deryabin, N.V. Loginova, G.A. Lebedeva, A.S. Novokhatskiy and I.V. Malakhova, Institute of Virology imeni D.I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] Somatic hybridization was used to produce a group of hybridomas producing monoclonal antibodies to the Japanese encephalitis virus. After fusion of the cells of mouse myeloma X63-Ag 8/653 and NS-0 with mouse splenocytes immunized with clone three of the Japanese encephalitis virus, hybridomas of series EYa were obtained, seven of which actively reproduced and generated monoclonal antibodies to the virus. The degree of survivability and transplantability of the hybridomas producing the monoclonal antibodies in BALB/c mice was studied as a function of the preparations used to sensitize the mice. Serologic studies of acidic preparations of hybridomas producing monoclonal antibodies were also performed. Two of the four hybridoma preparations obtained (EYa-4 and EYa19) had high reproduction potential upon peritoneal administration to mice, allowing six successive passages of acidic tumors in 4 months of observation. The maximum survivability and transplantability was 80% for EYa-4 cells. The data obtained indicated the possibility of using full Freund's adjuvant and pristane as

synthesizing preparations, though the use of Freund's adjuvant lengthened to 30 days or more the time required to form acidic tumors and yielded low growth activity of hybridoma cells from these mice throughout all passages. Pristan reduced the time of formation of acidic tumors, increased the accumulation of cells and the volume of ascitic fluid, while retaining monoclonal antibody titers. The monoclonal antibodies produced are of interest for production of active diagnostic preparations and their protective significance should be studied in experimental infection with Japanese encephalitis virus in animals. References 8: 5 Russian, 3 Western.

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CSO: 1840/329

UDC 615.357.814.32:577.175.322].012.6:[579.842.11:579.222

COMPARATIVE RADIOLIGAND ANALYSIS OF GENETICALLY ENGINEERED AND HYPOPHYSIAL HUMAN SOMATOTROPIC HORMONE

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 31, No 11, Nov 86 (manuscript received 11 Nov 85) pp 841-845

[Article by G.A. Popkova, Ye.I. Kandyba, L.V. Stroyeva, Ye.F. Yegorova, A.V. Tkachenko, R.A. Altshuler, P.M. Rubtsov, V.I. Naktinis, A.A. Yanulaytis, G.K. Korotayev and K.G. Skryabin, All-Union Scientific Research Institute of Technology of Blood Substitutes and Hormonal Preparations; Institute of Molecular Biology, USSR Academy of Sciences, Moscow; "Ferment" Scientific-Production Association, Vilnyus]

[Abstract] The Institute of Molecular Biology, USSR Academy of Sciences has used methods of genetic engineering to produce strains of E. coli which produce human somatotrophic hormone. In this article, methods of radio-immunologic and radioreceptor analysis, supplemented by biological activity studies and gel chromatography, are used to investigate the properties of the substances and medicinal forms of somatogen in comparison to the properties of hypophysial somatotrophic hormone. A preparation of somatotrophic hormone produced by genetic engineering provided by the Kabi Vitrum company of Sweden was also tested for comparison. No difference was found between the genetically engineered product and hypophysial product in affinity to antibodies produced on hypophysial product or to rabbit liver membrane receptors. The genetically engineered product contains 94.6% hormone monomer and is more homogeneous than the hypophysial product and the genetically engineered product produced by Kabi Vitrum. Figures 3; references 18: 2 Russian, 16 Western.

6508/13046

CSO: 1840/338

IMPROVING TECHNOLOGY OF SEPARATION AND CONCENTRATION IN PRODUCTION OF MICROBIAL SYNTHESIS PRODUCTS

Moscow BIOTEKHNOLOGIYA in Russian No 5, Sep-Oct 86 (manuscript received 7 May 86) pp 32-38

[Article by Ya.Ya. Shkop, N.V. Fomchenko, A.I. Guslavskiy, Ye.Ye. Tsvid, B.S. Ksenofontov and V.G. Popov, All-Union Scientific Research Institute of Biosynthesis of Protein Substances, Moscow]

[Abstract] The cells of microorganisms have an electrokinetic potential (EKP). To select optimal methods for separation of such cells, they can be grouped as to EKP, and the most effective and economical separation method selected for each group. The task is simplest for cells of the first group, including yeast grown on paraffin or ethanol, with low EKP (-30 mv), for which flotation is the most effective means of separation. Cells in the second group (EKP = -45 mv), yeast cells with no tendency toward adhesion but good cohesive properties, can be separated without modifying the medium by precipitation and filtration. The third group includes yeast and bacterial cells with high EKP and little adhesion or cohesion, requiring modification of both the cells and the culture medium to make the properties of the cells closer to those of the first two groups, such as by neutralization of the surface by changing the pH of the medium or addition of coagulants and flocculation. Principles are suggested for constructing a system of methods of separation and concentration of cell suspensions: differentiation of conditions of separation of microbial suspensions; use of combined methods based on several individual approaches; combining methods of separation and modification of culture fluids; and application of membrane methods. Figures 3; references 18: 17 Russian, 1 Western.

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LOW-INERTIA SEMISUBMERGED MICROBIOCALORIMETER

Moscow BIOTEKHNOLOGIYA in Russian No 5, Sep-Oct 86 (manuscript received 1 Mar 86) pp 60-66

[Article by Ye.F. Andreyev and M.A. Kazaryan, All-Union Scientific Research Biosynthetic Institute, Moscow]

[Abstract] Flow-through microbiocalorimeters widely used in scientific research do not have sufficient measurement accuracy and cannot be used to study viscous culture fluids and mixtures with solid inclusions. A semi-submerged microbiocalorimeter is suggested which does not have these shortcomings. The device includes a submerged measurement chamber, system for

circulating the mixture being studied and a measurement instrument. The submerged chamber is a plastic block consisting of two hollow symmetrical caps with two 12.1 mm diameter apertures. The chambers are made of a highly heat conductive material with heat insulating tubes at the inlet and outlet. The chambers are connected by a U-shaped spiral, reducing the dimensions of the submerged portion of the device. The design avoids the need for a pump which can be sterilized, reduces dimensions of the submerged portion and avoids areas which cannot be sterilized, increasing accuracy of measurement by eliminating uncontrolled heat sources and it eliminates trauma to microorganisms, caused by pumps. The accuracy of the device is confirmed by experimental use, its sensitivity and inertial properties are measured. The device can operate with a computer and can be used as a sensor in automatic control systems. Figures 3; references 9 (Russian).

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EVALUATION OF PROTEIN PRODUCTS OF YEAST BIOMASS

Moscow BIOTEKHNOLOGIYA in Russian No 5, Sep-Oct 86 (manuscript received 5 Feb 86) pp 67-72

[Article by M.G. Bezrukov, M.L. Ioffe, A.P. Kovalev and A.A. Pavlov, All-Union Scientific Research Institute of Biosynthesis of Protein Substances, Moscow]

[Abstract] There are three main trends in creation of feed additives based on protein of microorganisms, a promising part of the Soviet nutrition program: use of the entire biomass of microorganisms; use of biomass partially purified; and use of purified proteins isolated from the biomass. Economic as well as medical and biological characteristics must be considered in selecting the approach to be taken. The full-cell biomass of yeast grown on ethanol under sterile conditions, a product called "torutein," produced by Amoco Foods in the USA, is the only presently-approved whole-cell protein product. The present article reports on the first stage in the investigation of protein products of varying degrees of purification obtained from the biomass of *p. Candida* grown on n-paraffins according to the methodologic principles of medical-biological evaluation of the quality of new protein sources. Biological evaluation of four types of products was performed, each corresponding to a different stage of the technological process in production of protein isolate: biomass after disintegration, denucleated protein concentrate, denucleated protein concentrate after removal of peptides, and protein isolate. The studies indicate varying biological effectiveness of the partially-purified protein products. The whole biomass of microorganisms was more effective than biomass after disintegration and concentrates, possibly due to liberation of intracellular components during cell-wall breakdown. The product free of nucleic acids but containing peptides has lower biological value than the product with the nucleic components and the peptides, indicating that the nucleic components protect the organism from the action of the

peptides. Only the protein isolate was close in biological effectiveness to casein. Figures 1; references 17: 4 Russian, 13 Western.

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BIOLOGICAL VALUE OF PROTEIN ISOLATES FROM MICROBIAL SYNTHESIS

Moscow BIOTEKHNOLOGIYA in Russia No 5, Sep-Oct 86 (manuscript received 25 Apr 86) pp 73-78

[Article by M.L. Ioffe and M.G. Bezrukov, All-Union Scientific Research Institute of Biosynthesis of Protein Substances, Moscow]

[Abstract] The biological value of protein isolates was determined by the growth, balance and framework methods on white rats receiving isocaloric and isonitrogen synthetic diets balanced with respect to vitamin and mineral composition with the only source of protein consisting of isolates from yeast grown in media containing paraffins (*Candida guilliermondii*), ethanol (*C. lambica*) or methanol (*Hansenula polymorfa*). The animals receiving protein isolate ate poorly, were listless and lost hair; rats receiving whole yeast protein ate eagerly, were active and were cleaner. Body-weight dynamics were negative in the animals receiving protein isolate, losing 8.7% of initial body weight by the end of the 28-day experiment, whereas animals receiving whole yeast protein increased body weight by a factor of 2.3, as opposed to 3.5 in the control animals receiving casin. The biological value of protein isolates depends strongly on the conditions of their separation. Conditions which support preservation of the initial total and enantiomer amino acid composition provide maximum biological protein value, identical to the most valuable proteins of plant origin (soy) and approaching casein. Further studies of possible unfavorable cumulative effects and long-term sequelae are required to judge the full nutrient value of these proteins. Figures 3; references 13: 2 Russian, 11 Western.

6508/13046
CSO: 1840/356

UDC 663.033.063.86

INFLUENCE OF HYDRODYNAMIC STRUCTURE OF FLOWS ON PROCESSES IN BUBBLER REACTOR

Moscow BIOTEKHNOLOGIYA in Russian No 5, Sep-Oct 86 (manuscript received 12 Dec 85) pp 114-120

[Article by A.A. Arzamastsev, Institute of Chemical Engineering, Tambov]

[Abstract] A study is presented of the function of distribution density with respect to time of stay (PRVP) by the liquid phase in a bubbler reactor; the

PRVP function pattern varies with respect to rate of feed of the gas flow. The influence of the hydrodynamic structure of the flow on basic technological variables of a fermentation process was also examined. Studies were performed in the first section of a fermenter with a volume of 47.5 m³ using a salt containing radioactive sodium iodide as a tracer. A mathematical model of the biochemical reactor was constructed and used to process the results of experiments with the radioactively-labeled salt. The results show that the flow rate of gas used to aerate the bubbler significantly influences the form of the distribution density with respect to time spent by the liquid phase in the reactor, which defines the hydrodynamic situation in the reactor. The form of this distribution significantly alters the technological variables of the fermentation process, including concentrations of biomass, substrate and oxygen, specific productivity and degree of conversion of the substrate. Figures 2; references 20: 16 Russian, 4 Western.

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UDC 663.14.012.3

ENERGY CONSUMPTION IN PRODUCTION OF FODDER PROTEIN BY MICROBIOLOGICAL INDUSTRY

Moscow BIOTEKHNOLOGIYA in Russian No 5, Sep-Oct 86 (manuscript received 27 May 86) pp 133-136

[Article by V.S. Selifontova and A.A. Sokolov, All-Union Scientific Research Institute of Biosynthesis of Protein Substances, Moscow]

[Abstract] Nutrient yeasts produced on media containing petroleum hydrocarbons are called paprin, and are presently produced on a wide industrial scale. This article attempts to determine the structure of consumption of energy in the industrial production of paprin and compute energy flow indices based on a single energy equivalent in the production of a unit of the product. The unit of measurement is the standard fuel unit, requiring conversion of the Gcal used for thermal energy and kW·hr used for electric power. The actual energy consumption can thus be compared with the quantity of energy obtained in the composition of high-calorie feed product, averaging 4 million calories per ton, or 16.7 GJ/T. The mean energy-consumption required for the production of 1 million calories as nutrient yeast is approximately 7 GJ. Performance of similar calculation for other food-product production processes will yield a comparative evaluation of the energy consumed per unit of energy contained in the end products produced.

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CSO: 1840/356

ENVIRONMENT

UDC 578.088.91/581.526.33

Sr-90 AND Cs-137 IN PEAT DEPOSITS OF LOW-LYING MOOR IN VICINITY OF BELOYARSK
NUCLEAR POWER STATION

Sverdlovsk EKOLOGIYA in Russian No 3, May-Jun 86 (manuscript received
13 Jun 85) pp 46-51

[Article by M.G. Nifontova, V.I. Makovskiy and N.V. Kulikov, Institute of
Plant and Animal Ecology, Urals Scientific Center, USSR Academy of Sciences]

[Abstract] Monitoring studies were conducted on the Sr-90 and Cs-137 levels in peat deposits in the low-lying Olkhovskiy Moor in the vicinity of the Beloyarsk Nuclear Power Station. The resultant data demonstrated that, over a 20-year period, the effluent waters from the power station led to a 2- to 9-fold increase in the levels of Sr-90 in the peat deposits, and a 16- to 230-fold increase in the Cs-137 levels in comparison with the radionuclide concentrations in a control moor. In the various regions of the moor, 28-44% of the Sr-90 is concentrated in the topmost 0-25 cm peat layer, while 45-53% of the Cs-137 is similarly located. Finally, 80-95% of the total concentration of both radionuclides is found at a depth of 0-75 cm. Essentially identical distribution of these radionuclides prevailed in the control moor exposed only to global radioactivity via precipitation. The liquid radioactive waste also led to increased levels of radionuclides in the Olkhovskiy Moor flora. References 8: 7 Russian, 1 Western.

12172/13046

CSO: 1840/370

EPIDEMIOLOGY

UDC 579.841.11:632.35:633.18

PSEUDOMONAS ORYZICOLA--PATHOGEN OF RICE BACTERIOSIS IN UKRAINE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 3, May-Jun 85
(manuscript received 11 Jul 83) pp 34-38

[Article by I.B. Koroleva, R.I. Gvozdyak and L.A. Pasichnik, Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] Bacteriosis of rice in the USSR is still a problem, although the need to study rice bacteriosis there was noted as early as 1936. The present study isolated bacteria from diseased seeds and plants, studied and identified the isolates pathogenic for rice. The pathogen isolated was identified as *P. oryzicola*, which the authors have then separated, studied and described in the Ukraine for the first time. The pathogenic bacteria isolated from the rice seeds were preserved in the seeds under laboratory conditions without losing their virulent properties for 5 years. Figures 4; references 22: 11 Russian, 11 Western.

6508/13046

CSO: 1840/281

UDC 616.441-006.6(477.8)

THYROID CANCER IN CARPATHIAN UKRAINE

Kiev VRACHEBNOYE DELO in Russian No 12, Dec 86 pp 59-60

[Article by M.P. Pavlovskiy and R.D. Makar, Chair of Surgical Diseases, Lvov Medical Institute]

[Abstract] Case studies pertaining to thyroid carcinoma were reviewed for Carpathian endemic goiter region in the Ukraine for the period 1964-1983. In that timeframe, 2,410 thyroid operations were performed, resulting in a diagnosis of a malignancy in 171 patients (7.1%): the female to male ratio was 150:21. Histologic classification led to a diagnosis of papillary carcinoma in 97 (56.7%) cases, follicular carcinoma in 43 (25.1%), medullary in 15 (8.8%), and undifferentiated tumor in 15 (8.8%) of the patients. A dimorphic malignancy was diagnosed in one (0.6%) patient. In 53 patients (31%) a diagnosis of carcinoma was made or suspected prior to histologic

evaluation. In the first decade a carcinoma was diagnosed as a result of surgery in 3.7% of the cases, rising to 9.0% ($P < 0.001$) in the second decade. In addition, in those two time-periods the percentage of papillary carcinoma increased from 37.5 to 61.6% ($P < 0.05$), while the undifferentiated forms decreased from 31.5 to 3.6% ($P < 0.01$). Although the incidence of thyroid cancer in the region has increased, there has been no improvement in pre-surgical diagnosis. There is obvious need for greater physician alertness to this clinical entity. References 7 (Russian).

12172/13046

CSO: 1840/377

GENETICS

UDC 579.873.71:[579.252.55:615.332]:[577.212.3:575.222.75

STUDY OF AMPLIFICATION OF KANAMYCIN RESISTANCE DETERMINANT (KAN^r) IN COMPOSITION OF CONSTRUCTED HYBRID PLASMIDS OF STREPTOMYCES LIVIDANS

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 30, No 8, Aug 85 (manuscript received 12 Mar 85) pp 565-572

[Article by L.I. Starodubtseva, A.S. Taisova and V.N. Danilenko, All-Union Scientific Research Institute of Antibiotics, Moscow]

[Abstract] Some DNA fragments are capable of multiple tandem repetition or amplification in the composition of the genomes of many strains of streptomyces, reaching 500 copies per genome, an increase which may occur within a single generation. This amplification is atypical for procaryototic microorganisms, but is observed in certain eucaryotes. Amplification can aid in the creation of strains which are superproducers of biologically-active substances. The determinant of resistance to kanamycin is capable of intensive amplification in streptomyces rimosus, which produces oxytetracycline. The possibility has been demonstrated of amplifying one of the constructed hybrid plasmids pSU10 in the strain S. lividans 66. The purpose of this work was continued physical-chemical and genetic analysis of the constructed plasmid containing the Kan^r determinant and study of the capability for amplification. In all cases, variants of S. lividans were obtained containing hybrid plasmids and resistant to 500 or 5,000 µg/ml of antibiotic in liquid medium. Restriction analysis showed the presence of intensive DNA fragments corresponding to hybrid plasmid fragments, the presence of deletions in the Kan^r determinant and the presence in pSU4 and pSU6 of additional fragments with molecular weights of 5.3 and 2.7 MD. Figures 4; references 26: 4 Russian, 22 Western.

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CSO: 1840/290

SOME SPECIFICS OF THE PROCESS OF TRANSFORMATION OF AGROBACTERIUM TUMEFACIENS BY PLASMID DNA

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 4, Jul-Aug 85
(manuscript received 14 Mar 84) pp 80-83

[Article by S.Ye. Rymar and T.V. Stefanishina, Institute of Molecular Biology and Genetics, UkSSR Academy of Sciences, Kiev]

[Abstract] Agrobacterium tumefaciens contains the Ti-plasmid, a unique natural vector for plant cells, which has been used to transfer many foreign genes to plant cells. This work studies the influence of some transformation system parameters in order to improve the effectiveness of this process, which has been poorly studied in the past. The influence of ionic strength of the buffer in which the DNA was dissolved, ratio of volumes of DNA solution and cell suspension at the moment of infection, time of dilution of DNA-cell mixture after freezing and temperature at which freezing of the mixture occurred were studied. It was found that the ratio of volumes of DNA solution and cell suspension was the most significant factor. Effectiveness of Agrobacterium transformation can be increased by a factor of 10 to 50 by changing the ratio of these volumes, the maximum being achieved at a DNA-cell volume ratio of 1:10. The transformation of frozen and thawed cells is most effective where DNA is dissolved in a buffer with low ionic-strength, apparently a result of the influence of the conformation state of the plasmid DNA on transformation effectiveness. The following transformation system is suggested: 5 μ l of DNA solution in 1-10 mM tris-buffer, pH 7.5, mixed with 50 μ l cell suspension, incubated for 5 minutes in a dry ice-ethanol or other cooling mixture at -70°C , transferred to a water bath at 30°C and diluted after 5 minutes with 5-10 times YEB medium. Figures 1; references 11: 1 Russian, 10 Western.

6508/13046
CSO: 1840/282

ROLE OF CONJUGATIVE TRANSFER OF R-PLASMIDS IN COMPETITIVE INTERACTIONS OF PLASMID-CONTAINING AND PLASMID-FREE STRAINS OF ESCHERICHIA COLI UNDER CONTINUOUS CULTIVATION CONDITIONS

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 30, No 1, Jan 85 (manuscript received 29 Aug 84) pp 22-27

[Article by A.M. Boronin, A.Ye. Filonov and T.Ye. Yerova, Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences, Pushchino]

[Abstract] A study is presented of the role of conjugative plasmid transfer in the competition of plasmid-containing and plasmid-free populations of

bacteria in continuous cultivation in a chemostat or pH-stat. A mutant plasmid RP4 was obtained, not capable of conjugative transfer but retaining resistance markers of the plasmid RP4 and with an electrophoretic picture of the PstI DNA fragments indistinguishable from the restriction DNA picture of the Tra⁺ plasmid. After 95 hours of competition, the rate of dilution was increased and the plasmid-free cells were reduced to 1% of the total population by hour 147, remaining at that level through the end of the experiment. No conjugative transfer of a plasmid to plasmid-free strain was observed. Competition of plasmid-containing cells with plasmid-free cells of strain C600 in a chemostat ended in extraction of the plasmid-containing strain, which decreased to about 1% of the total population. The studies indicate that conjugative transfer of plasmids is a significant factor influencing competitive interactions of plasmid-containing and plasmid-free cells under continuous cultivation conditions. When conjugative transfer occurs in the chemostat and pH-stat continuous cultures, the fraction of plasmid-free cells in the population decreases, in spite of their higher growth rate. Without conjugative transfer, the plasmid-free cells expel the plasmid-containing population in a chemostat. In a pH-stat, the initial relationship of plasmid-containing and plasmid-free cells is retained. Conjugative transfer is therefore one factor in stabilizing plasmid in a population of bacteria. Figures 5; references 14: 3 Russian, 11 Western.

6508/13046

CSO: 1840/287

IMMUNOLOGY

AIDS AND IMMUNOLOGY RESEARCH IN USSR

Moscow MOSCOW NEWS in English No 3, 25 Jan-1 Feb 87, p 10

[Article by Anna Nikolayeva: "Research in World Laboratories and AIDS Research in the USSR"]

[Text] "Original and interesting immunological research is in progress in the Soviet Union. Unfortunately, little is known about it in the West, and the great importance of the Moscow gathering stems from the possibility it provides for getting acquainted with Soviet achievements. Our agenda brought up the subject of new varieties of such grave diseases as immunodeficiencies," Prof. Alain De Weck, Switzerland, told a "Moscow News" correspondent. Along with a number of other foreign scientists, Prof. De Weck has taken part in the proceedings of the All-Union Symposium on Immunodeficiencies and Allergies. The notorious AIDS, being one particular case of immunodeficiencies, has already taken away thousands of lives in the USA and Europe.

"More and more often clinicians of all kinds are coming across disorders of the immune system which either partially or entirely fails to defend the organism. This is what immunodeficiencies are about," says Academician Rem Petrov, Director of the Immunology Institute of the USSR Ministry of Health, who chaired the symposium. "Hereditary, or induced by viruses and injuries, immunodeficiencies are a serious challenge to medical scientists. Complications after a difficult surgery or the flu, as well as various chronic diseases, can be traced to a breach in the body's immune defenses.

"What part of the system fails in each particular case is still beyond our ability to tell with any great certainty.

"Ways of detecting and eliminating defects in the immune system, in other words, immunocorrection, were in the focus of the discussions at the symposium. The limelight was on research on new varieties of immunodeficiencies. We have, for example, reported the discovery at the immunology department of Moscow's 2d Medical Institute of so-called interleukin-related immunodeficiencies (interleukin is a mediator hormone of the immune system). Academician

Lopukhin has described a failure of the immune system caused by thymic ischemia (inadequate blood supply of the gland). Professor S. Gambarov reported on the development in a number of cases of the deficit of special cells of the immune system--the so-called countersuppressors.

"These new and fairly complex problems are the targets of the efforts of immunologists in many countries," Academician Petrov continued. "Soviet and American scientists, for example, have learned to correct some immune disorders with substances extracted from the thymus. And another--this time a marrow-originated substance--is being tested at the Immunology Institute as a possible immunodeficiency compensator. In short, there is an energetic search for means of fighting various types of immunodeficiencies, which could be greatly enhanced by concerted efforts of scientists from all over the world."

The issue has been made particularly urgent by the epidemic of AIDS in the United States, which has almost reached the scope of a national disaster.

To Fence Off AIDS

AIDS is caused by a specific virus which homes in on the most important cells of the immune system--helper T-lymphocytes--and destroys them. AIDS is a particular case of immunodeficiencies, but differs greatly from other varieties. It is contagious and in most cases lethal.

Investigations on AIDS, which is substantially different from any other immunodeficiency, have taken two paths: there are attempts to develop vaccines to prevent its spread and drugs to treat people already infected. To detect AIDS a number of diagnostic test systems have been developed in many countries, including the USSR.

"Most of them, developed in the USA, France, the USSR, and elsewhere, are usually based on the AIDS virus itself, which has been of course previously killed," says Rem Petrov. "We (at the Institute of Immunology of the USSR Ministry of Health) have decided to do without the virus which is neither very easy nor very safe to produce. The alternative is to synthesize that section of the virus's protein which stimulates the production of antibodies to the AIDS virus. The appearance of these infection-fighters is all the evidence we need to pin down the disease. This technique has already been used successfully. The test system based on the synthetic peptides is much cheaper and has a number of other advantages."

Rem Petrov is optimistic about the possible development of an AIDS vaccine:

"We do not think that the application of synthetic segments is confined to diagnostics. At the Institute, original approaches for creating synthetic vaccines have emerged."

According to the Soviet scientist, the treatment of AIDS presents a much greater challenge: the deadly culprit must be killed and the damage repaired. Researchers are trying to find a drug that would prevent the AIDS virus from imbedding itself within the cells.

Scientists' attitude towards AIDS places them in two camps: one is rather pessimistic and predicts a further spread of the disease, and the other believes that the epidemic will be contained since AIDS can be prevented.

Academician Petrov looks into the crystal ball with hope.

"Since it has been positively established that AIDS can be passed from one person to another either through sexual contact or with blood," he says, it is possible to put up the necessary barriers: a healthier lifestyle and a screening of the donor blood banks. Centralized health care and new diagnostic techniques have brought such screening well within our reach."

Research on All Fronts With the Same Goal

An artificial vaccine mentioned by Academician Petrov has become an imperative since such scourges as flu, gonorrhea, malaria and foot-and-mouth disease defy any conventional vaccines prepared from a weakened or killed microbe.

And that is where, in Academician Petrov's words, a momentous and earnest competition between scientists is underway.

"Americans have made great strides in this aspect and have been producing a wealth of chemical duplicates and protein segments of infectious agents. Alas, none of these substances, parts of pathogens, have yet succeeded in inducing an immunity to any of the aforementioned diseases, the same being the case with the whole pathogenic organisms. We have been working along different lines, which made any foreign experience irrelevant," says the scientists. "We have been hunting for ways to make the body react to these weak nonimmunogenic molecules of the viruses, thus creating the immunity. These ways have been found and given us a formidable edge over our foreign 'rivals.'"

"To produce an artificial vaccine, it may be necessary to load synthetic segments of a virus on an equally synthetic carrier-molecule. This vaccine would start off the assembly line of antibodies which are the real infection-fighters. International cooperation of scientists may contribute a great deal to these developments."

Professor De Weck agrees that immunologists in the East and West should unite their efforts since much promising work is being done in many countries. He describes the recent achievements of Soviet immunology as magnificent, while pointing out that we lag behind in allergy studies. Allergy, which is an overreaction of the body's immune system to an alien agent and thus the opposite of immunodeficiency, was also the subject of many discussions at the Moscow symposium. Academician Petrov underscored, in particular, the intimate way in which these two extremes are related to each other.

/13046
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UDC 579.841.11.083.3

PROTECTIVE PROPERTIES OF PSEUDOMONAS AERUGINOSA ANATOXIN

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85
(manuscript received 1 Nov 83) pp 83-86

[Article by N.F. Dzyuban and L.G. Podgornaya, Kharkov Scientific Research
Institute of Microbiology of Vaccines and Sera]

[Abstract] A new specific preparation against *Pseudomonas aeruginosa* has been developed at the authors' institute, *Pseudomonas aeruginosa* anatoxin. This article studies the harmlessness and immunogenic properties of this preparation with respect to several strains of *Ps. aeruginosa*. The studies showed that the *Ps. aeruginosa* anatoxin produced on a full acid casein hydrolysate was harmless and equal in immunologic activity to an anatoxin produced on Marten's broth. The immunizing dose was 10 to 15 times less in the new substance. White mice were immunized with various doses of the preparation; then, after 7 days, live cultures of homologous and 12 heterologous strains of *Ps. aeruginosa* were administered at 50 LD₅₀. Active immunization protected the white mice in all cases. The minimum ED₅₀ of the anatoxin was observed in all cases for third, eighth and twelfth serotypes. References 9: 8 Russian, 1 Western.

6508/13046
CSO: 1840/280

UDC 615.371:579.843.94].015.2?:615.332].015.46.07

INFLUENCE OF COMBINED APPLICATION OF RIFAMPICIN AND LOW MOLECULAR WEIGHT
NATURAL ORIGIN IMMUNOMODULATOR ON PRIMARY IMMUNE RESPONSE TO TULAREMIA
VACCINE STRAIN ANTIGENS

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 30, No 10,
Oct 85 (manuscript received 29 Mar 85) pp 760-765

[Article by A.V. Nikitin, L.P. Ivanitskaya, L.Ye. Bodunkova, L.P. Kovalenko,
V.M. Fishman, M.G. Sheptovitskaya, K.B. Ogorelkova and L.N. Ostanina,
All-Union Scientific Research Institute of Antibiotics, Moscow]

[Abstract] A study is presented of the influence of combined application of rifampicin and one of the low molecular weight immunomodulators on the humoral

immune response and elevated delayed-type sensitivity upon immunization with antigens from a vaccine strain of tularemia. Experiments were performed on male mice with a low molecular wt. immunomodulator obtained from the culture fluid of a strain of gram-negative microorganism. The method of multifactor experimental planning was found to be the optimal method to study the functional relationship of dose-time parameters in combined application of antibiotics and immunomodulators. The functional equations derived were used to construct nomograms allowing accurate quantitative estimation of the basic indicators of cellular and humoral immunity over a broad range of the factors. The low molecular wt. immunomodulator in combination with rifampicin had a clear immunocorrective effect on the humoral and cellular immune responses to the tularemia vaccine strain antigens. Figures 2, references 7: 5 Russian, 2 Western.

6508/13046
CSO: 1840/292

UDC 579.852.13.222'19:612.017.1

EFFECT OF BOTULISM TOXIN ON IMMUNE RESPONSE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 4, Jul-Aug 85
(manuscript received 9 Apr 84) pp 76-79

[Article by I.N. Morgunov, G.B. Afonina and V.G. Bordonos, Kiev Medical Institute]

[Abstract] Eight serologic varieties of botulism toxin are now known, with similar molecular weight and structure but differing tropicity for tissues of various species of animals. Studies of changes to the immune system in botulism have been quite insufficient. The influence of the botulism toxin on the immune response is of great interest, because of the absence or instability of immunity to botulism and the nature of the primary preventive and therapeutic measures, which consist primarily of active and passive immunization. The authors studied the effect of the botulism toxin on the immune response of the organism using the model of immunization of animals with sheep erythrocytes, staphylococcus and botulism anatoxins to generate both primary and secondary immune responses. Subminimal doses of the toxin had a significant and statistically-reliable stimulating influence in the productive phase of the primary and secondary immune response upon immunization with sheep erythrocytes and staphylococcus anatoxin. Stimulation was extended both to antibody production and formation of antibody-generating spleen cells. Administration of the same dose of toxin during the early portion of the immunization cycle yielded much less stimulating effect. Different results were obtained by administration of the same dose of toxin against a background of immunization with botulism anatoxin. Stimulation of antibody production was observed in this case only by administration of toxin in the early stages of immunogenesis, during the inductive phase of the immune response. At later stages of immunization, during the productive period of the immune response, subminimal doses of botulism toxin had no

statistically-reliable stimulating effect, possibly due to neutralization by the specific antibodies which were appearing. The botulism toxin significantly changes the nature of the immune response to antigens. This is determined by the dose of the toxin and the time of its administration. References 14: 6 Russian, 8 Western.

6508/13046
CSO: 1840/282

UDC 615.339:578.245].012.6

NATURAL INTERFERON INDUCTORS: DOUBLE-HELICAL RNA *SACCHAROMYCES CEREVISIAE*
KILLER PLASMIDS

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 30, No 1,
Jan 85 (manuscript received 18 Jun 84) pp 19-21

[Article by A.V. Duzhak, A.N. Kostomakha, N.N. Lobova, V.F. Podgornyy, N.N. Nosik and F.I. Yershov, Scientific Research Design-Technology Institute of Biologically Active Substances, Main Administration of Microbiological Industry, Berdsk; Institute of Virology imeni D.I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] Killer strains of *S. cerevisiae* containing double-stranded RNA in the plasmids, are a potential source for the production of interferon inducers. This article studies the possibility of using various methods of purification to produce biologically-active, double-stranded RNA from *S. cerevisiae* killer strains. The desired effect was achieved by reprecipitation of double-stranded RNA in lithium chloride solutions and interphase distribution in chloroform-isoamyl alcohol-water. The preparation thus produced contained practically no DNA, protein or carbohydrates. The major impurities are single-stranded RNA. The preparation contained 30-90% double-stranded RNA. Preparations containing 30 and 70% double-stranded RNA were found to be highly-active interferon inducers in mice, high interferon titers being recorded 5 hours after administration of the preparation and remaining at a rather high level after 24 hours. Increasing double-stranded RNA content to 70% increases interferon-inducing activity, but also involves increased toxicity. References 15: 5 Russian, 10 Western.

6508/13046
CSO: 1840/287

EFFECT OF COMBINED USE OF DEXTRAN SULFATE AND DOUBLE-STRANDED RNA ON INTERFERON PRODUCTION

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 30, No 1, Jan 85 (manuscript received 25 May 84) pp 16-19

[Article by N.N. Amitina, E.B. Tazulakhova and F.I. Yershov, Institute of Virology imeni D.I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow]

[Abstract] The immunostimulant dextran sulfate can induce formation of interferon in mice. Combined use with high molecular weight interferon inducers increases their effects. The authors attempted to demonstrate this effect with poly G- poly C, a synthetic polynucleotide complex and RFF₂, a natural interferon inducer consisting of double-stranded replicative RNA from the amber mutant phage isolated from E. coli. Administration of dextran sulfate hastens the production of interferon under the influence of the inducers and increases the titer of interferon produced. The increase in production is qualitatively different from the effect of increasing interferon production caused by diethylaminoethyl dextran. Dextran sulfate apparently blocks L-cell receptors necessary for induction of interferon by poly I-poly C, whereas diethylaminoethyl dextran apparently changes the membrane such that the production of interferon by L cells increases. The point of action of dextran sulfate is apparently the immunocompetent system cells. Figures 3; references 8: 4 Russian, 4 Western.

6508/13046
CSO: 1840/287

INFLUENCE OF POLYSACCHARIDES ISOLATED FROM MARINE INVERTEBRATES ON SOME FUNCTIONS OF T- AND B-LYMPHOCYTES

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 30, No 1, Jan 85 (manuscript received 15 Feb 84) pp 43-47

[Article by T.S. Zaporozhets, R.G. Ovodova, N.N. Besednova, V.I. Molchanova, A.V. Nikitin and L.P. Kovalenko, Scientific Research Institute of Epidemiology and Microbiology, Siberian Department, USSR Academy of Medical Sciences; Pacific Institute of Bioorganic Chemistry, Far Eastern Scientific Center, USSR Academy of Sciences, Vladivostok; All-Union Scientific Research Institute of Antibiotics, Moscow]

[Abstract] A study is presented of the influence of polysaccharides isolated from marine invertebrates on some functions of T- and B-lymphocytes. The study of the kinetics of serum antibodies, hemolysins and hemagglutinins showed that administration of polysaccharide Number 42 one day before immunization of animals with sheep erythrocytes increased their titer

throughout the study. Polysaccharide Number 106 had a similar stimulating effect on antibody formation only when simultaneously administered with the antigen. Polysaccharide Number 42 caused a statistically-reliable increase in rosette-forming cells in the mouse spleen, an increase in the percent of rosettes formed by the more mature subpopulation of lymphocytes. Administration of polysaccharides from marine invertebrates caused either an increase or a decrease in the intensity of delayed-type hypersensitivity. The preparations were most effective when administered at 6.6 mg per kg body weight one day before application of the antigen, stimulating humoral and cellular immunity. Figures 1; references 8: 5 Russian, 3 Western.

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CSO: 1840/287

UDC 615.276.4.076.9

COMPARATIVE ESTIMATION OF INFLUENCE OF IMMUNOSTIMULANTS ON ACTIVITY OF CERTAIN MOUSE THYMUS DEHYDROGENASES

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 30, No 8, Aug 85 (manuscript received 8 Jan 85) pp 595-598

[Article by K.G. Gapochko, L.P. Sviridov, P.V. Tsyplenkov and Yu.V. Yurkevich, Military-Medical Academy imeni S.M. Kirov, Leningrad]

[Abstract] It is important to estimate the level of activity of enzyme systems, particularly certain dehydrogenases. There has been little published concerning the influence of immunostimulants on the activity of dehydrogenases in immunocytes. The purpose of the present work was comparative estimation of the effects of immunostimulants on the specific activity of certain mouse thymus dehydrogenases. The immunostimulants have various effects on the activity of the mouse thymus dehydrogenases studied. RNA, prodigiosan and levamisol caused various changes in specific activity of the dehydrogenases. RNA caused early activation of LDH, MDH and HDH, indicating a significant increase in metabolic activity of the thymus. Prodigiosan stimulated LDH and GDH activity, intensifying processes of glycolysis and oxidative deamination of amino acids. Levamisol produced extended activation of GDH. References 13: 11 Russian, 2 Western.

6508/13046
CSO: 1840/290

INFLUENCE OF MYTILAN, A POLYSACCHARIDE FROM CRENOMYTILUS GRAYANUS, ON LOCAL SUPPURATIVE PROCESS

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 30, No 8, Aug 85 (manuscript received 5 Nov 84) pp 600-604

[Article by N.F. Krylova, R.G. Ovodova, N.N. Besednova, V.Ye. Glazkova and V.I. Molchanova, Scientific Research Institute of Microbiology and Epidemiology, Siberian Department, USSR Academy of Medical Sciences; Pacific Ocean Institute of Bioorganic Chemistry, Far Eastern Scientific Center, USSR Academy of Sciences, Vladivostok]

[Abstract] A study is presented of the effects of the neutral polysaccharide mytilan, isolated from the bivalve mollusk *Crenomytilus grayanus*, on the course and result of a local staphylococcus suppurative infection. Experiments were performed on mice infected with a culture of staphylococcus aureus grown at 37°C on meat-peptone agar. A local purulent infection was induced by administration of 50 million microbodies of a virulent *S. aureus* culture in 0.05 ml fluid. The influence of mytilan was studied with respect to a *S. aureus* culture labeled with ^{14}C . The polysaccharide was administered intraperitoneally at 25 mg per kg body weight one day before infection. Mytilan was found to strengthen the natural resistance of the organism to the localized staphylococcus infection. The preparation has a clear anti-exudative and antinecrotic effect. Mytilan has an effective immunotherapeutic effect upon three-times administration after infection with staphylococcus culture. Administration of mytilan increases the absorptive activity of macrophages in the mice infected with the *S. aureus* culture labeled with ^{14}C . References 8 (Western).

6508/13046

CSO: 1840/290

FEATURES OF PORPOISE AUDITORY CORTEX ORGANIZATION

Leningrad VESTNIK LENINGRADSKOGO UNIVERSITETA: BIOLOGIYA in Russian No 3,
Aug 86 (manuscript received 6 Feb 85) pp 54-64

[Article by Ye.I. Krasnoshchekova and I.I. Figurina]

[Abstract] Studies were performed on 14 adult common porpoises (*Phocaena phocaena*) in order to determine the location of the auditory cortex more precisely by the use of morphological methods and to study the structure and organization of connections in this cortical region. Fink-Heiner, Nauta-Gygax, Nissl and Golgi methods and retrograde transport of horseradish peroxidase were used to study the location, cytoarchitectonics and neuronal organization of the auditory cortex and its descending, associative and commissural connections. It was found that the medioposterior section of the ectosylvian gyrus, the posterior section of the sylvian gyrus, and the middle section of the suprasylvian gyrus comprise the cortical end of the auditory analyzer. In the region, 4 cortical fields were identified with the following characteristics: slight cytoarchitectonic differences between individual fields, the absence of layer 4; by the small number of corticoaxonal neurons and predominance of pyramidal cells in all layers of the cortex; by confinement of many of the endings of associative, commissural and projectional afferents to layer 1 and by the presence of direct descending pathways from the auditory cortex to the cochlear nuclei and the acoustic nerve. The uniqueness of the cytoarchitectonics, neuronal structure and organization of the thalamic, intra- and interhemispheric and descending connections of the porpoise auditory cortex suggest that this special type of cortex exists only in cetaceans. Figures 4; references 15: 10 Russian, 5 Western.

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CSO: 1840/416

MEDICINE

UDC 617-089.168-06:616-002.3]-085.339.578.245

INCREASING ACTIVITY OF PROTECTIVE FACTORS IN PATIENTS WITH PURULENT SURGICAL INFECTION BY APPLICATION OF INTERFERON PREPARATIONS

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 30, No 10, Oct 85 (manuscript received 7 Feb 85) pp 770-773

[Article by V.A. Karlov, S.M. Belotskiy, O.B. Filyukova, V.S. Zuyeva, V.D. Solovyev and V.P. Kuznetsov, Department of Wounds and Wound Infections, Headed by Professor B.M. Kostyuchenok, and Laboratory of Experimental Surgery (Headed by Professor V.F. Portnoy), Institute of Surgery imeni A.V. Vishnevskiy, USSR Academy of Medical Sciences; Scientific Research Institute of Epidemiology and Microbiology imeni N.F. Gamaleya, USSR Academy of Medical Sciences]

[Abstract] The development of purulent surgical infection is frequently accompanied by suppression of defense factors. This article studies the effect of interferon on various immunologic indices in patients with generalized purulent surgical infection, a subject not previously discussed in the literature. Case histories of several patients are briefly discussed. Administration of interferon increased the number of T lymphocytes in 7 of 13 patients, Tact in 9 and ESR_{staph} in 10. The mean values of absolute number of all cells studied were increased in comparison to the initial level by a reliable and significant quantity ($P < 0.05$). A reliable increase in phagocytic activity of neutrophils with complement receptors, plus an unreliable increase in phagocytic activity of neutrophils with Fc receptors was also observed. Phagocytosis activity was increased, time required to achieve clinical effectiveness was decreased to 19.8 days from 43.8 days without immunotherapy, 32.3 days upon administration of leukocyte mass and 25 days upon administration of hyperimmune antistaphylococcus plasma. Figures 1; references 10: 5 Russian, 5 Western.

6508/13046

CSO: 1840/292

CLINICAL TRIALS WITH PRAZOSIN IN TREATMENT OF HYPERTENSION

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 12, Dec 86 (manuscript received 27 Mar 86) pp 66-68

[Article by N.L. Mirzayev, B.N. Salikhov and I.N. Abdullayeva, Scientific Research Institute of Cardiology, Uzbek SSR Ministry of Health]

[Abstract] Therapeutic trials were conducted on prazosin (Adverzuten, "Germed" Firm of East Germany) in the case of 47 male and female patients with hypertension, with a mean age of 52.2 ± 1.4 years (33-66 years). The patients were started on a daily dose of 1.5 mg/day, with an eventual increase to 20 mg/day for some patients over the 18-day period of the study. Therapeutic efficacy of prazosin became apparent within 3 days; after 15 days the mean systolic BP decreased from 191 ± 4.3 to 149.7 ± 2.8 mmHg ($P < 0.001$), and the diastolic pressure from 112.0 ± 2.0 to 91.1 ± 1.6 mmHg ($P < 0.001$). However, in some patients, the clinical improvements were variable and unstable, and required combination with other agents. Concomitantly, the heart rate increased from a mean of 77.2 ± 1.1 to 79.8 ± 1.1 bpm during the course of prazosin therapy. References 5: 3 Russian, 2 Western.

12172/13046
CSO: 1840/376

UDC 615.33:579.841.93].012.6

INFLUENCE OF CULTIVATION CONDITIONS ON SYNTHESIS OF BRUCELLACIN

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 30, No 10, Oct 85 (manuscript received 30 Aug 84) pp 754-747

[Article by I.S. Tyumentseva, Ye.N. Afanasev and L.P. Sveshnikova, Scientific Research Antiplague Institute of the Caucasus and Transcaucasus]

[Abstract] Bacteriocins have been detected in brucella, as in most other bacterial species. The intensity of production of bacteriocins depends largely on external conditions. The purpose of this article was to find the optimal conditions of cultivation facilitating stable production of bacteriocin brucella. The optimal pH range for production of brucellacin was found to be broad. Most intensive production of brucellacin was observed on a nutrient medium with a density of 0.5%, pH 6.6-7.7 agar layer thickness 4-5 mm. However, agar of this density is difficult to work with; agar at 1.3% density achieves satisfactory results with satisfactory workability. Brucellacin was not detected in media prepared from tryptic preparations. The optimal medium is made from peptic preparations from products of animal origin. Nutrient media based on peptic preparations of cattle and semisynthetic nutrient media assuring stable production of bacteriocin for brucella of various species have been developed. References 13: 9 Russian, 4 Western.

6508/13046
CSO: 1840/292

UDC 579.841.91.222

EXOCELLULAR O-ANTIGENIC POLYSACCHARIDE OF ALCALIGENES FAECALIS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 3, May-Jun 85 (manuscript received 5 Dec 83) pp 65-71

[Article by G.M. Zdorovenko and S.I. Skripnik, Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] A number of gram-negative microorganisms can liberate substances called "free" endotoxins or "free" lipopolysaccharides into the environment. The biological significance of this excretion is not presently known. The

purpose of this article was to produce, study the chemical composition and certain structural peculiarities and biological properties of exocellular O-antigen polysaccharide of *Alcaligenes faecalis*, a species of opportunistic microorganism little-studied to date. The exopolysaccharide was found to have high serologic activity in reaction with O-serum, high specific O-antigenic properties and was similar in physical-chemical characteristics but not identical to the lipopolysaccharide of the culture fixed in the outer membrane. The excreted lipopolysaccharide gives the microbe cell advantages in interaction with macroorganisms, since it neutralizes antibodies to the bacterial cell. The exopolysaccharide, being fixed in the outer membrane of the culture, should be sensitive to extreme conditions, which may explain the differences in physical and chemical characteristics of free and fixed lipopolysaccharide. Figures 9; references 16: 5 Russian, 11 Western.

6508/13046

CSO: 1840/281

UDC 579.69:620.193.8

MICROORGANISMS AS FACTOR IN CORROSION OF TYPE 45G17YuZ STEEL EXPOSED TO SEA WATER

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 3, May-Jun 85
(manuscript received 1 Dec 83) pp 8-13

[Article by Ye.I. Andreyuk, S.B. Yanover, Zh.P. Kopteva, N.F. Naumenko, N.P. Zvyagintseva, Ye.P. Lyakh and V.G. Petrov, Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] Microbiological corrosion under sea-water is an important part of the total corrosion problem. This article studies the population and group composition of microorganisms in the first overgrowth film on type 45G17YuZ steel under sea-water conditions. The bioresistance of the steel in sea-water was also studied upon exposure to certain heterotrophs taken from the surface of the same steel under field experimental conditions. The microbial film was found to contain ammonifying, denitrifying, manganese-oxidizing, sulfate-reducing bacteria and bacteria growing in a medium with thiosulfate. Slime-forming bacteria were also present in large quantities. Thionic, nitrifying and sulfur-oxidizing microorganisms were not found. Denitrifiers, known to be corrosion agents, predominated. A greater area of surface damage was observed on experimental specimens with bacterial films than on control specimens, with point corrosion and corrosive damage extending deeper into the specimen than in the control specimens. Particularly large ulcers were observed in specimens submerged in water inoculated with *Pseudobact. boreale* 7/4 and *B. singulare* 6/3. Figures 4; references 5 (Russian).

6508/13046

CSO: 1840/281

CORROSION OF STEEL IN SOIL UNDER INFLUENCE OF SULFUR CYCLE BACTERIA

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 3, May-Jun 85
(manuscript received 13 Dec 83) pp 13-18

[Article by N.S. Antonovskaya, A.I. Pilyashenko-Novokhatnyy, I.A. Kozlova and Ye.I. Andreyuk, Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] A study is presented of the corrosion of steel in soil under the influence of thionic and sulfate-reducing bacteria in a model laboratory experiment. Specimens of type 20 steel were immersed in glass cylinders 50 mm in diameter containing compacted soil, yellow clay with carbonaceous quartz pelitic grains. The soil specimens and metal plates were sterilized with γ -radiation, then inoculated with 5-day cultures of sulfate reducing and (or) 3-day cultures of thionic bacteria plus nutrient medium. After 6 months exposure, it was found that incubation of the associations of bacteria studied facilitated rapid growth and elevated biological activity. The corrosion rate of metal specimens in soil inoculated with *D. desulfuricans* 45 (+) was 3.72 mg/dm²·day, in soil inoculated with *D. desulfuricans* 51 (+ or -) the corrosion rate was 2.44 mg/dm²·day. In native soil, the corrosion rates were 4.72 and 4.80 mg/dm²·day, apparently because the native soil contained sulfate-reducing bacteria plus acidophobic thionic bacteria. Experiments were continued to 1 year, indicating an increase in the titer and biological activity of the sulfur cycle bacteria, the vital activity of which was activated directly by the metal. Sulfate-reducing bacteria with clear hydrogenase activity facilitate cathodic depolarization of the metal by utilizing hydrogen from the polarization layer on the surface of the steel. Figures 5; references 18: 8 Russian, 10 Western.

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UDC 582.288-11

SURVIVAL OF CERTAIN MELANIN-CONTAINING HYPHOMYCETES AT LIQUID HELIUM TEMPERATURE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 3, May-Jun 85
(manuscript received 9 dec 83) pp 59-64

[Article by A.I. Vasilevskaya, A.L. Antonenko, N.N. Zhdanova and V.F. Udovenko, Institute of Microbiology and Virology, Ukrainian Academy of Sciences, Kiev; Physical-Technical Institute of Low Temperature, UkSSR Academy of Sciences, Kharkov]

[Abstract] There are two main ecologic groups of microorganisms capable of actively growing at temperatures below 5°C. The first of these is adapted to

persistent cold conditions, while the second is adapted to unstable conditions, corresponding to the subdivision of microorganisms into psychrophilic and psychrotolerant species. Fungi encountered under low temperature conditions are characterized by a number of morphologic, biological and physiological-biochemical peculiarities. Several reports have been published on the ability of fungi to survive single, long-term exposure to very cold temperatures. The authors have demonstrated previously that dried conidia of some species and mutants of dark hyphal fungi can survive liquid helium temperatures for 5 minutes to 30 hours. The present study continues this work, studying the survival of the conidia of the same melanin-containing hyphomycetes after several days exposure to extremely low temperatures. Four strains of dark hyphomycetes and three light-colored mutants of the initial *Cladosporium cladosporioides* (dark Ch-1, coffee K-1 and apigmented BM) were studied, placed in a cryostat with liquid helium at -269°C , to create a temperature shock, and held for 5 minutes to 5-8 days, some up to 13 days. The results showed that species which are resistant or sensitive to various extremal factors such as γ rays, critical oxygen content and extreme humidity conditions are resistant or sensitive to super-low temperatures as well. References 19: 14 Russian, 5 Western.

6508/13046
CSO: 1840/281

UDC 579.852.13:579.252.55:615.33

METHODOLOGIC APPROACHES FOR ACCELERATED DETERMINATION OF ANTIBIOTIC SENSITIVITY OF GAS GANGRENE PATHOGENS

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 31, No 7, Jul 86 (manuscript received 30 Apr 85) pp 545-550

[Article by T.I. Sergeyeva, Ye.P. Zemlyanitskaya, I.Z. Kurbanova and B.S. Atayeva, Scientific Research Institute of Epidemiology and Microbiology imeni N.F. Gamaleya, USSR Academy of Medical Sciences, Moscow; Scientific Research Institute for Production of Nutrient Media, Makhachkala]

[Abstract] Methods currently used abroad to determine the antibiotic sensitivity of the major gas gangrene pathogen, *Clostridium perfringens*, cannot be applied in Soviet laboratories due to differences in nutrient media and methodologies, as well as criteria for estimation of antibiotic sensitivity. The authors therefore undertook a cycle of investigations to develop methodological approaches for rapid determination of the antibiotic sensitivity of *C. perfringens*, *C. oedematiens*, *C. histolyticum*, and *C. septicum*. Problems addressed in the studies included development of standardized nutrient media available for practical use, assuring rapid and abundant growth of cultures and not having an inactivating effect on antibiotics; development of conditions of early determination and precise measurement of zones of inhibited growth; determination of criteria for evaluating the degree of antibiotic sensitivity of the pathogens; and development of systems and methods of accelerated determination of antibiotic sensitivity of the pathogens. A

quantitative description of the diameters of growth inhibition zones by antibiotics is presented, allowing determination of criteria for characteristics of antibiotic sensitivity of *C. perfringens* and development of an evaluation table. Standardized nutrient media AChZh-a and AChP-a are developed from dry components produced in the Soviet Union, suitable for rapid antibiotic sensitivity testing of the major gas gangrene pathogens. Figures 2; references 16: 8 Russian, 8 Western.

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UDC 579.873.71.25

GLOBISPORINE GROUP STREPTOMYCETE PLASMIDS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 4, Jul-Aug 85
(manuscript received 29 Mar 84) pp 83-88

[Article by L.V. Polishchuk, T.D. Dekhtyarenko, Ye.Ye. Stefanishin, B.P. Matselyukh and V.Ye. Kozyritskaya, Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] Streptomycete plasmids have been intensely studied around the world to determine their role in the biosynthesis of antibiotics and vector molecules based on them. This work studies strains of streptomycetes of the globisporine group for the presence of plasmids which could be used as vectors in gene engineering research. Thirty strains of streptomycetes of the globisporine group were screened to locate extra chromosomal DNA. One representative was found to contain extra chromosomal DNA of low molecular weight, probably controlling the synthesis of an antibiotic substance inhibiting the growth of certain strains. The plasmid has unique restriction sites and can be used in the construction of a vector. Figures 4; references 15: 5 Russian, 10 Western.

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CSO: 1840/282

MICROFLORA OF XB-5153 ANTIFOULING COATING USED UNDER MARINE CONDITIONS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 4, Jul-Aug 85
(manuscript received 30 Jan 84) pp 3-6

[Article by Ye.I. Andreyuk, Zh.P. Kopteva, S.B. Yanover, V.V. Zanina, A.Ye. Kopteva, Ye.P. Lyakh and V.G. Petrov, Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] A study is presented of the population and group composition of microorganisms on the primary overgrowth film of type XB-5153 paint under marine conditions. Specimens of type 09G2 steel were painted according to the instructions and immersed in the sea to a depth of 1 m. Microorganisms were studied after 1, 3, 7, 14, 30, 60 and 90 days exposure. The microbial film formed on the surface of the paint was found to consist of bacteria of various ecologic-trophic groups--ammonifying, denitrifying, hydrocarbon-oxidizing, manganese-oxidizing bacteria and bacteria growing on media containing colophony and copper. During the first few days, all these types except hydrocarbon-oxidizing bacteria were found. Beginning on day 14, bacteria growing in the presence of colophony and copper dominated. The population of all groups increased with time. These bacteria may affect the process of leaching of toxins from the antifouling coatings. Figures 3; references 10 (Russian).

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INFLUENCE OF CORRODING STEEL ON POPULATION AND BIOLOGICAL ACTIVITY OF SULFUR CYCLE BACTERIA IN SOIL

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 4, Jul-Aug 85
(manuscript received 13 Dec 83) pp 6-10

[Article by N.S. Antonovskaya, A.I. Pilyashenko-Novokhatnyy, I.A. Kozlova and Ye.I. Andreyuk, Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] A study is presented of the influence of corroding metal on the quantitative distribution and biological activity of sulfur cycle bacteria in soil in a model laboratory experiment. Sulfate-reducing and thionic bacteria were studied using two strains of *Desulfovibrio desulfuricans* with different hydrogenase activity levels and one strain of acidophobic thionic bacteria--*Thiobacillus thioparus*--in 6-month experiments. The sulfate-reducing bacteria with clear hydrogenase activity reproduced most rapidly in the soil. The maximum number of cells of these bacteria were observed in the

zone directly adjacent to the metal surface. This increase in number of cells near the metal may be explained by migration of these bacteria from zones with lower content of soluble iron ions to zones with higher concentration of iron ions in a corrosion-increasing cycle. Interaction of sulfur-cycle bacteria with the metal in the soil is manifested as a significant increase in the number of microorganism cells near the surface of the metal, increasing their biological activity, which intensifies the process of corrosion of the metal. Figures 4; references 14: 4 Russian, 10 Western.

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UDC 579.69:620.193.8

INFLUENCE OF BACTERIA ON CORROSION RESISTANCE OF NONFERROUS METAL ALLOYS USED IN SHIPBUILDING

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85
(manuscript received 12 Jul 83) pp 15-19

[Article by Ye.I. Andreyuk, S.B. Yanover, Zh.P. Kopteva, N.F. Naumenko, Ye.P. Lyakh and V.G. Petrov, Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] A study is presented of the influence of heterotrophic bacteria taken from the surface of nonferrous metal alloys, exposed in sea water, on corrosion of aluminum bronze Br.AMts 9-2 and brass LK 80-3, which are used in construction of marine screw propellers. The alloys reacted variously to the heterotrophic bacteria, depending on chemical composition and structure of the alloys. A significant increase in corrosive processes occurred in bacterial cultures on the brass specimens, with a suppression of corrosion on the bronze. The results indicate that bacteria can be used as test media in the selection of materials for the manufacture of screws and other metal structures. Figures 4; references 11: 7 Russian, 4 Western.

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UDC 577.19:582.282.123.4

TOXIN-FORMING CAPACITY OF NATURAL ASPERGILLUS FUMIGATUS ISOLATES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85
(manuscript received 20 Sep 83) pp 57-60

[Article by Z.A. Kurbatskaya and A.A. Trostanetskiy, Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] Mycotoxins are significant among substances contaminating food products. Some 30 species of aspergillus can form toxins and produce

metabolites highly toxic for man and other homiotherms. *Aspergillus flavus* and *A. fumigatus* cause toxicoses, mycoses, mycotic abortions and allergic disease. *A. fumigatus* on feed grains can produce toxic substances of various types. This article studies the capability of natural *A. fumigatus* Fres isolates to produce indolic toxic metabolites and presents a toxicologic description of the substances. Natural isolates of *A. fumigatus* differing in cultural and morphologic characteristics were found to produce several extracellular mycotoxins. Predominant among them are the gliotoxins. Strains with typical cultural-morphologic characteristics predominate in capability for formation of mycotoxins. Figures 2; references 19: 6 Russian, 13 Western.

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UDC 579.69:620.193.8

FORMATION OF MICROBE FILM ON SURFACE OF CERTAIN NONFERROUS METAL ALLOYS IN SEA WATER

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 1, Jan-Feb 85
(manuscript received 12 Jul 83) pp 7-13

[Article by Ye.I. Andreyuk, S.B. Yanover, Zh.P. Kopteva, N.F. Naumenko, N.P. Zvyagintseva, Ye.P. Lyakh and V.G. Petrov, Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] A study is presented of the population and group composition of microorganisms found under marine conditions on the surface of aluminum bronze Br.Amts 9-2 and brass LK 80-3 used for the manufacture of screw propellers and other parts in shipbuilding. The brass specimens were found to be more subject to corrosion than bronze specimens. After 14 days of exposure to sea water, surface damage was observed on the brass. With longer exposure, the brass specimens took on a greenish-bluish color with copper patches on the surface. Point, ulcer and slot corrosion was observed. In 7 to 12 months, point defects 1-1.5 mm in diameter and 0.1-0.3 mm deep were formed. After 1 year corrosion damage, particular along the edges of specimens, reached 5-10 mm wide, 1-1.5 mm deep. The corrosion damage of the specimens was found to depend on a complex of physical-chemical and microbiological factors which cannot be studied in isolation. Figures 4; references 11: 9 Russian, 2 Western.

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CSO: 1840/279

CORROSION OF LOW-CARBON STEEL IN CULTURE OF DESULFOVIBRIO DESULFURICANS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 1, Jan-Feb 85
(manuscript received 9 Apr 84) pp 13-17

[Article by N.S. Antonovskaya, I.A. Kozlova and Ye.I. Andreyuk, Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] A study is presented of the nature of the corrosive process upon long-term exposure of steel plates in a culture of sulfate-reducing bacteria taken from the surface of corroded metal. A culture of *D. desulfuricans* strain 45 was taken from the surface of a gas pipeline which had been in use in corrosive soil for 10 years. Experiments were performed in 500 ml flasks filled with Postheit "B" medium on specimens of type 20 steel suspended from capron filaments and fully immersed in the medium, inoculated with the culture of sulfate-reducing bacteria. The specimens lost weight throughout the time of exposure but the dynamics of corrosion growth were complex, with two corrosion rate maxima on the 30th and 700th days, when corrosion rates were 12 and 9 times greater than in a sterile medium. The complex nature of the corrosive process can be explained by the formation of a thin film of iron sulfide on the surface of the steel, which may either increase corrosion, acting as a cathode for the metal, or prevent corrosion, protecting the surface of the metal from the corrosive medium. The great increase in corrosion rate in the bacteria with time apparently occurs due to breakdown of the thin iron-sulfide film and development of galvanic corrosion microelements. Bacteria were demonstrated to have both indirect and direct participation in the increase in the process of metal corrosion: indirect by decreasing the oxidation-reduction potential of the medium and the accumulation of hydrogen sulfide; direct by breaking down the surface film. Figures 3; references 9: 5 Russian, 4 Western.

6508/13046
CSO: 1840/279

POSSIBILITY OF USING INDIRECT HEMAGGLUTINATION REACTION TO DETERMINE SENSITIVITY OF MALLEUS (GLANDERS) AND MELIOIDOSIS BACTERIA TO ANTIBIOTICS

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 31, No 6, Jun 86 (manuscript received 20 May 85) pp 454-456

[Article by L.N. Ferster, V.A. Zharkova, N.P. Khrapova and Ye.A. Volkov, Volgograd Scientific Research Antiplague Institute]

[Abstract] A study is presented of the possibility in principle of using the indirect hemagglutination test for rapid determination of the sensitivity of glanders and melioidosis bacteria to antibiotics. The results confirm the

effectiveness of the antibiotics doxycycline and chlorotetracycline and the ineffectiveness of ampicillin, which actually stimulates the glanders bacteria, and show the possibility in principle of using the indirect hemagglutination test to study the sensitivity of these bacteria to antibiotics in pure cultures and suspensions from the organs of infected animals. The use of suspensions from infected animal organs, bypassing the isolation of pure cultures, greatly reduces the time required for studies and indicates the potential of the test. References 13: 12 Russian, 1 Western.

6508/13046
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UDC 576.8

MICROBIAL BIOECENOSIS AND ITS MODIFICATION IN ACTIVE OIL FIELDS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA in Russian No 4, Jul-Aug 86 (manuscript received 3 Dec 85) pp 485-493

[Article by M.V. Ivanov, S.S. Belyayev, K.S. Laurinavichus and A.Ya. Obraztsova, Institutes of Microbiology (Moscow) and of Microbial Biochemistry and Physiology (Pushchino), USSR Academy of Sciences]

[Abstract] Studies were conducted on the microbial flora of oil fields in the Tatar ASSR, demonstrating the significance of such studies on the chemical composition of the oil pools and gas production, as well as in improving oil production. For example, forced aeration of the water drive with the addition of nitrogen and phosphorus salts exerts a twofold effect on the oil pool microbial flora. In the initial stage, the aerobic flora is activated, leading to acidification of the residual oil. In addition, metabolites such as carbon dioxide and low MW organic compounds permeate the oxygen-poor residual oil pool and act as agents increasing oil production, as well as substrates for anaerobic bacteria, many of them methanogenic. As a result, the second stage involves greater bacterial methanogenesis. The methane produced in this manner may be utilized as a combustion gas and, in addition, functions to improve the fluidity of oil and, hence, its recovery. Figures 5; references 13: 12 Russian, 1 Western.

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CSO: 1840/418

PATHOGENIC EFFECTS OF PLAGUE BACILLUS IN FLEA (XENOPSYLLA CHEOPIS):
TIME-RELATED ULTRASTRUCTURAL CHANGES IN PATHOGEN WITHIN VECTOR ORGANISM

Leningrad PARAZITOLOGIYA in Russian Vol 20, No 1, Jan-Feb 86 (manuscript received 10 Jan 84) pp 19-22

[Article by N.P. Konnov, T.A. Demchenko, P.I. Anisimov, K.I. Kondrashkina and A.D. Lukyanova, All-Union "Mikrob" Scientific Research Antiplague Institute, Saratov]

[Abstract] An ultrastructural analysis was conducted on the gastrointestinal tract of fleas (*Xenopsylla cheopis*) following feeding on moribund mice infected with the plague bacillus, and on the bacterial pathogen, following ingestion. The ultrastructural changes reflected the manner of penetration of the epithelial layer of the flea stomach and its destruction in the process. Following penetration, the bacteria became agglomerated in dense masses of hematin. Such 'immured' bacteria showed a variety of shapes, ranging from ovoid to bacillary, as well as spheroplasts and protoplasmic forms. More extensive damage to the gastrointestinal tract of the flea was accompanied by systemic infection of the fleas. Figures 2; references 13: 11 Russian, 2 Western.

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GROWTH OF SUBMERGED CULTURES OF BASIDIOMYCETES *PANUS TIGRINUS* AND
DAEDALEOPSIS CONFRAGOSA

Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 20, No 3, May-Jun 86 (manuscript received 4 Jul 85) pp 199-204

[Article by A.N. Kapich, I.V. Stakheyev and I.S. Vazhinskaya, Institute of Microbiology, Belorussian SSR Academy of Sciences, Minsk]

[Abstract] An analysis was conducted on the growth curves of *P. tigrinus* IBK-131 and *D. confragosa* G-115 in submerged cultures on glucose-peptone at 300 rpm and 26°C. In the exponential phase of growth, the rate of growth was 0.07 h⁻¹ for *P. tigrinus* and 0.08 h⁻¹ for *D. confragosa*, with corresponding doubling times of 9.9 and 8.7 h. Highest concentrations of protein ranged from 2.59 to 2.69 g/liter for *D. confragosa* and *P. tigrinus*, with respective amino acid scores of 94.3 and 85.7. These findings demonstrated that in terms of nutrient value they exceeded those of wheat (53), rice (67) and soybean (74), and approached those of animal proteins (cow's milk--95, whole egg--100). Figures 2; references 15: 9 Russian, 6 Western.

12172/13046
CSO: 1840/364

OPTIMIZATION OF NUTRIENT MEDIUM FOR PRODUCTION OF EXTRACELLULAR HETEROPOLYSACCHARIDE BY CRYPTOCOCCUS ELINOVII

Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian Vol 20, No 3, May-Jun 86
(manuscript received 29 Jan 85) pp 215-218

[Article by V.A. Petrovskiy, M.E. Meller, M.A. Kashkina, S.V. Gurina and
L.I. Bryukhova, Leningrad Institute of Pharmaceutical Chemistry]

[Abstract] Optimization studies on nutrient medium for production of extracellular heteropolysaccharides by *Cryptococcus elinovii* bolubev led to definitions of the following formulation as providing optimum conditions: 50 g/L glucose, 3 g/L peptone, 3.56 g/L KH_2PO_4 , 7.22 $\text{Na}_2\text{HPO}_4 \cdot 7\text{H}_2\text{O}$, 0.28 g/L $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, 0.75 g/L NaCl, 0.001 g/L $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$, 0.0015 g/L $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$, 0.015 g/L $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$, 30 ml yeast autolysate, 0.035 g/L NaNO_2 . Growth for 120 h at 25-26°C and a pH of ca. 6.0 with 220 rpm led to maximum yields of extracellular heteropolysaccharide of 4.2 g/liter in ca 96 h. The key component in the medium responsible for stimulation of polysaccharide biosynthesis was NaNO_2 in a concentration of 0.035 g/liter. Figures 1; references 14: 12 Russian, 2 Western.

12172/13046

CSO: 1840/364

EFFECT OF ELECTROMAGNETIC RADIATION IN DECIMETER RANGE WAVELENGTH ON CALCIUM CURRENT OF SNAIL NEURONS

Moscow BIOFIZIKA in Russian Vol 31, No 2, Mar-Apr 86 (manuscript received
24 May 84; after revision 14 May 85) pp 264-268

[Article by S.I. Alekseyev, V.I. Ilyin and V.V. Tyazhelov, Institute of
Biological Physics, USSR Academy of Sciences, Pushchino, Moscow Oblast]

[Abstract] Effect of 900 MHz microwave field (MF) on calcium current in dialysed snail neurons (*Lymnae stagnalis*) at 18-20°C was studied. An increase in calcium current was observed which was proportional to specific absorption intensity in the range of 0.1-20 Wt/kg, evidently induced by heat effect of the microwave field. This was supported by the observation that with effective heat removal from the cell no current changes were observed. Absence of distinct nonthermal effects of MF may indicate that either they do not affect the functions of calcium channels or that the changes are negligibly small. Figures 3; references 15: 7 Russian (1 by Western author), 8 Western (2 by Russian authors).

7813/13046

CSO: 1840/425

UDC 615.322

ANTIMICROBIAL PROPERTIES OF POLYACETYLENE ANTIBIOTIC PHENYLHEPTATRIYNE

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85
(manuscript received 2 Aug 83) pp 81-83

[Article by A.S. Bondarenko, G.T. Petrenko, B.Ye. Ayzenman and O.V. Yevseyenko,
Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev]

[Abstract] The authors first discovered the antimicrobial properties of phenylheptatriyne and described the production of phenylheptatriyne from *B. cernuus* L., establishing its selective antimicrobial activity. This article presents the results of further studies of the antibiotic and other biological properties of phenylheptatriyne. The substance suppresses the growth of many species of gram-positive bacteria and dermatophytes at 5-50 µg/ml, of certain yeasts at 10-50 µg/ml, of species of the genus *Candida* at 50-400 µg/ml, but is ineffective on most gram-negative bacteria, mycellial phytopathogenic and saprophytic fungi except for *Rhizoctonia solani* and *Drechslera graminea*, the growth of which is inhibited at 10-20 µg/ml. Blood serum in vitro decreases the antimicrobial activity of phenylheptatriyne. It greatly inhibits the process of spore formation by *Microsporum canis*, and resistance is not developed in 24 passages on media containing subfungistatic concentrations. The LD₅₀ of the antibiotic for white mice upon subcutaneous administration is 4,245 mg/kg, with intraperitoneal administration--525 mg/kg. References 6: 3 Russian, 3 Western.

6508/13046
CSO: 1840/280

NEW AMINOGLYCOSIDE ANTIBIOTIC PRODUCED BY MUTANT STRAIN STR. CREMEUS SUBSP. TOBRAMYCINI 535

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 30, No 10, Oct 85 (manuscript received 10 Apr 85) pp 729-732

[Article by N.V. Konstantinova, M.F. Lavrova, T.P. Nesterova, N.P. Potapova, V.I. Ponomarenko, B.V. Pozynov, M.G. Brazhnikova, O.A. Lapchinskaya and O.P. Sinyagina, Institute for the Search for New Antibiotics, USSR Academy of Medical Sciences, Moscow]

[Abstract] A search for a complex to increase the yield of carbamoyl tobramycin has led to the development of strain 535, which synthesizes an antibiotic distinguished in its chromatographic behavior from components of the nebramycin complex and other known aminoglycosides. The antibiotic is produced as the carbamoyl derivative and adsorbed from the culture fluid on type KB-2 cation-exchange resin in sodium form, then eluted in a 1 N solution of ammonia. The material thus produced is hydrolyzed with 1 N NaOH at 100°C, for 2 hours to remove the carbamoyl group, the hydrolysate is chromatographed on a column of amberlite CG-50 in ammonia form, then purified on a column with Sephadex DEAE. Final purification is by chromatography on a column with Merck silica gel in a system consisting of chloroform, methanol, concentrated ammonia and a 5% boric acid solution with subsequent chromatography of KB-2 resin, then crystallized from aqueous methanol. The antibiotic thus produced differs from tobramycin in that there is a hydroxyl group instead of an amine group at C-6'. The sugar responsible for the difference between tobramycin and antibiotic 535 was split by acid hydrolysis and the sugar structure determined. Antibiotic 535 has been designated as 3'-desoxykanamycin C. Figures 3; references 3 (Western).

6508/13046
CSO: 1840/292

TOXICITY AND ANTIMICROBIAL PROPERTIES OF NEW AMINOGLYCOSIDE ANTIBIOTIC 535

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 30, No 10, Oct 85 (manuscript received 10 Apr 85) pp 743-747

[Article by L.Ye. Goldberg, S.T. Filipposyants, I.V. Malkova and S.P. Shapovalova, All-Union Scientific Research Institute for the Search for New Antibiotics, USSR Academy of Medical Sciences, Moscow]

[Abstract] A study is presented of the toxicity, pharmacokinetics, antibacterial spectrum and chemotherapeutic effect of the antibiotic 535 in comparison with tobramycin, which has the chemical structure 3'-desoxykanamycin B. The biological effect of antibiotic 535 and kanamycin A was also compared.

The LD₅₀ of antibiotic 535 with i/v, subcutaneous and peroral administration to white mice was 225, 1,150 and over 5,000 mg/kg. Following one-time subcutaneous administration to rabbits at 10 mg/kg, antibiotic 535 was rapidly assimilated and detected in the blood and organs for 24 hours. It is primarily excreted with the urine. No significant differences in the pharmacokinetics of antibiotic 535, tobramycin and kanamycin was found in rabbits. Antibiotic 535 has good antibacterial effect, suppressing gram-positive and gram-negative microorganisms. It is highly effective against infections caused by *S. aureus*, *E. coli*, *Pr. vulgaris*, somewhat less effective against *Ps. aeruginosa*, its chemotherapeutic indices being equal to tobramycin or superior. In treatment of experimental tuberculosis in white mice, antibiotic 535 and tobramycin are both inferior to kanamycin. References 12: 5 Russian, 7 Western.

6508/13046
CSO: 1840/292

UDC 615.281:547.831].07

ANTIMICROBIAL PROPERTIES OF QUINOLINE DERIVATIVES

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol 30, No 10, Oct 85 (manuscript received 10 Dec 84) pp 747-750

[Article by G.K. Paliy and Ye.F. Makats, Department of Microbiology (Headed by Professor G.K. Paliy), Vinnitsa Medical Institute imeni N.I. Pirogov]

[Abstract] For a number of years, a search has been conducted among quinoline derivatives for original compounds with antibiotic properties to help solve the problem of hospital strains of bacteria with multiple antibiotic resistance. This article discusses the antimicrobial properties of two new compounds in this class synthesized by G.T. Pilyugin and S.V. Shinkorenko, arbitrarily called substance Number 6 and substance Number 79. Compound Number 6 is nitron-containing quinoline. Its molecular weight is 573.48. Compound Number 79 contains quinoline and is an azomethine with a molecular wt. of 742.03. The two substances melt above 200°C and are quite soluble in organic solvents, slightly soluble in water. Test cultures of staphylococcus taken from patients with various diseases were tested by diffusion in agar on standard disks. Substance Number 6 has good antimicrobial activity against *S. aureus*, *C. diphtheria* and *C. albicans*. Strains of *S. faecalis*, *V. metchnikovi*, *Shigella* and *S. typhi* were sensitive to preparation Number 6 at 31.2 µg/ml. *Pr. vulgaris*, *Ps. aeruginosa* and *E. coli* were resistant to this preparation. Substance number 79 was active also against *S. aureus*, *C. diphtheriae* and *C. albicans*, but at higher concentrations, and was less effective against *B. subtilis*. Antibiotic-resistant strains of staphylococcus were thus highly sensitive to Number 6 and Number 79, and showed no cross resistance to them. References 17: 13 Russian, 4 Western.

6508/13046
CSO: 1840/292

INFLUENCE OF IMMOBILIZED TERRILYTIN ON ANTIGEN-SPECIFIC IMMUNE SUPPRESSION

Moscow ANTIBIOTIKI I MEDITSINSKAYA BIOTEKHNOLOGIYA in Russian Vol31, No 6, Jun 86 (manuscript received 11 May 85) pp 450-454

[Article by G.A. Chalyy, L.G. Prokopenko and L.P. Chalaya, Kursk Medical Institute]

[Abstract] The use of immobilized microbial enzymes is a new and promising trend in enzyme therapy. A preparation of terrilytin fixed on dextran, microbial proteases has been found effective in treatment of purulent infection, burns, thrombophlebitis and inflammatory processes in soft tissue. The adjuvant effect of terrilytin is mediated by a humoral antigen-specific factor generated in the spleen, which is of interest because the pathogenesis and sanogenesis of the disease for which it is used in treatment involve the immune mechanism. The influence of immobilized terrilytin on the immune reaction has not yet been studied. This work studies the influence of immobilized terrilytin on the development of the immune response induced by T-dependent antigen and the phenomenon of antigen-specific immunosuppression, which is important in the regulation of the intensity of the immune reaction. The results of the study show that the factor liberated by the rat spleen after injection of immobilized terrilytin is a powerful humoral immune stimulator, the effect of which is manifested both with ordinary antigen stimulation and with hyperimmunization-evoked activation of suppressor cells. Figures 3; references 17: 14 Russian, 3 Western.

6508/13046

CSO: 1840/332

COMPARATIVE STUDY OF ANTIMICROBIAL ACTIVITY OF NATURAL AND SYNTHETIC PHENYLHEPTATRIYNE AND ITS DERIVATIVES

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 3, May-Jun 85 (manuscript received 8 Aug 83) pp 101-104

[Article by A.S. Bondarenko, N.V. Kuznetsov, I.I. Krasavtsev, Ye.L. Mishenkova, G.T. Petrenko and O.V. Yevseyenko Institute of Microbiology and Virology, UkSSR Academy of Sciences, Kiev; Institute of Organic Chemistry, UkSSR Academy of Sciences, Kiev]

[Abstract] Phenylheptatriyne and a number of its derivative were synthesized and a comparative study was conducted of the antimicrobial activity of the synthesized substances, as well as of natural phenylheptatriyne, in order to determine the possibility of producing compounds with greater antimicrobial activity and to determine variation in activity as a function of chemical composition. The antimicrobial activity of the synthetic phenylheptatriyne

was found to be analogous to the natural substance, suppressing the growth of gram-positive and acid-resistant bacteria and dermatophytes at concentrations of 10-20 µg/ml, not affecting most gram-negative bacteria, mycelial saprophytic or phytopathogenic fungi. One-phenylhepta-1,3,5-tri-ene-7-ol was significantly more active than phenylheptatriene and had a broader spectrum of activity. 1,6-Diphenylhexa-1,3,5-tri-ene slightly inhibited the growth of individual macroorganisms. 1,8-Diphenylocta-1,3,5,7-tetraene had no effect on the bacteria and fungi tested. Replacement of the methyl group with a $C(CH_3)_2OH$ group led to some increase in antimicrobial activity, while a CH_2OH group caused a significant increase in antimicrobial activity an expanded spectrum of activity; replacement with a C_2Ph group caused a loss in antimicrobial properties. References 8: 4 Russian, 4 Western.

6508/13046
CSO: 1840/281

UDC 547.814.03

HYPNOTIC AND ANTICONVULSIVE ACTION OF 2-METHYL-2-(2-HEPTYLTHIO) ETHYL-4-HYDROXYMETHYL-1,3-DIOXOLANE

Dushanbe IZVESTIYA AKADEMII NAUK TADZHIKSKOY SSR: OTDELENIYE BIOLOGICHESKIKH NAUK in Russian No 1, Jan-Mar 86 (manuscript received 26 Dec 85) pp 86-88

[Article by Kh.I. Istatov, A.V. Gulín, S.S. Sabirov and K.Kh. Khaydarov, Tajik State Medical Institute imeni Abuali ibn-Sino]

[Abstract] The effect of the title compound (the Department of Bioorganic and Biological Chemistry of the Tajik State Medical Institute synthesized a colorless liquid, insoluble in water but readily soluble in organic solvents) was studied by determining the general nature of its effect on mice and its toxicity. Intraperitoneal injection of a 25-50 mg/kg dose into mice (18-22 g wt.) caused no visible changes in the mice's behavior. Increase of the dose to 100 mg/kg produced signs of depression such as sluggishness, adynamia, poor reaction to stimuli and restlessness. Larger doses (200-300 mg/kg) produced signs of pronounced depression such as catatonia and blepharoptosis. Reaction to pain and sound stimuli lessened or disappeared. A 400 mg/kg dose killed some mice in the first 6-8 hours after injection and a 600 mg/kg killed all mice injected. LD_{50} for the preparation was 475.0 ± 19.7 mg/kg. Hypnotic activity of the drug (speed of occurrence, duration and length of sleep) was studied in white mice (18-20 g). Increasing intraperitoneal doses confirmed the narcotic effect of the drug. Anticonvulsive activity of the drug was studied by use of a model of seizures caused by korazol and strychnine. Intraperitoneal injection of an 80 mg/kg dose of a 1 percent solution of korazol into white mice (19-21 g) caused spasms ending in death. A 4 mg/kg subcutaneous injection of strychnine nitrate caused tonic spasm and death in 100 percent of the cases. The compound was injected intraperitoneally 30 minutes before injection of 25-200 mg/kg of korazol. A 25 mg/kg dose had no effect on the time nor course of spasms. A 50 mg/kg dose delayed appearance of spasms and moderated their nature. A 150 mg/kg

dose completely eliminated the effect of korazol. Use of the drug after strychnine nitrate injection in the same doses as used after korazol injection was completely ineffective. The drug affected the cortex and subcortical formations of the brain, predominantly. References 2 (Russian).

2791/13046

CSO: 1840/408

UDC 615.276:615.099.08

PHARMACEUTICAL PROBLEMS IN ANTIDOTE SCIENCE

Kiev FARMATSEVITYCHNYY ZHURNAL in Ukrainian No 4, Jul-Aug 85 (manuscript received 16 Jan 85) pp 29-32

[Article by F.P. Trinus, Kiev Scientific Research Institute of Pharmacology and Toxicology]

[Abstract] A plea is presented for the development of studies on antidotes as a specialty in its own right, and to transfer such studies from the purely empirical basis to one based on solid grounding in scientific principles. The contribution of pharmacists in this endeavor would be to formulate selective and sensitive methods for antidote evaluation, develop physiologically acceptable methods of stabilization, and ensure the design of long-acting preparations. In addition to the research endeavors of the pharmacists, the pharmaceutical industry must provide the support and encouragement necessary for the development of scientific 'antidotology.' Figures 2; references 13: 7 Russian, 6 Western.

12172/13046

CSO: 1840/350

EFFECT OF ANTIBODIES TO S-100 PROTEINS ON ELECTRICAL ACTIVITY AND CHEMICAL SENSITIVITY OF CORTICAL NEURONS

Moscow BIOLOGICHESKIYE NAUKI in Russian No 8, Aug 86 (manuscript received 25 Jan 85) pp 48-52

[Article by N.A. Timofeyev, V.V. Sherstnev and Yu.Z. Anisimov, Scientific Research Institute of Normal Physiology, USSR Academy of Medical Sciences]

[Abstract] Brain specific properties of the S-100 group are evolutionary stable, show chemical heterogeneity, they are localized in glial elements and postsynaptic areas of nerve cells. Gamma-globulins exhibited a depressing effect on S-100 proteins towards learning processes and memory. Effect of antibodies to S-100 group proteins on electric activity and mediator sensitivity of mammalian central neurons was investigated by extracellular recording and microiontophoresis. Experiments were done on male rabbits. It was shown that antibodies to S-100 proteins led to intensified frequency of impulse activity in critical neurons. They also affected various mediator processes, especially the glutamatergistic mechanisms of the nerve cells, increased spontaneous discharge rate of the neurons and decreased, blocked or reverted neuronal responses to acetylcholine, noradrenaline and glutamate. An assumption was made that S-100 proteins regulate electrogenic and post-synaptic processes of neural and glial cells in the brain. Figures 3; references 29: 11 Russian, 18 Western.

7813/13046

CSO: 1840/400

EFFECTS OF IMMOBILIZATION STRESS, HEART INFARCTION AND SHORT-IMMOBILIZATION
ADAPTATION ON BRAIN LEVELS OF ENDOGENOUS PEPTIDES

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian No 5, Sep-Oct 85 (manuscript
received 23 Apr 84) pp 32-34

[Article by F.Z. Meyerson, A.D. Dmitriyev, V.I. Zayats, I.I. Rozhitskaya and
Ye.A. Kizim, Institute of General Pathology and Pathologic Physiology, USSR
Academy of Medical Sciences (USSR AMS); All-Union Center for Mental Health,
USSR AMS]

[Abstract] Male Wistar rats (180-200 g) were employed in a study designed to
assess the effects of various types of stress on brain levels of endogenous
opioids, as well as the effects of adaptation to stress. Immobilization of
the animals for 10 h or a heart infarction induced by ligation of the descend-
ing branch of the left coronary artery led, for the most part, to
statistically significant elevations of beta-endorphin, leu-enkephalin and
met-enkephalin in various formations (hypothalamus, cerebellum, cerebral
cortex, striatum). The stress-induced elevations were most pronounced in
formation with high baseline values, such as the hypothalamus and the striatum.
Elevation of met-enkephalin was also marked in the adrenal glands. Heart
infarction elicited essentially similar changes, with the elevation of met-
enkephalin in the adrenals being more pronounced than with immobilization. In
addition, adaptive stressing--consisting of immobilization for 15 min to 1 hr
for 13 days--resulted in the most significant elevations of the endogenous
opioids in the brain and the adrenal glands. Considering the analgetic
properties of these peptides, it may be that their response to adaptive
stressing reflected and facilitated physiological resistance to stress.
References 7: 4 Russian, 3 Western.

12172/13046
CSO: 1840/1008

UDC 612.123.-06:[612.766.2+612.391

HYPOKINESIA, NUTRITION AND LIPID METABOLISM: EFFECTS OF PROTEIN AND VITAMIN
DEFICIENCY ON SERUM LIPIDS AND LIPOPROTEINS IN HYPOKINESIA

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian No 5, Sep-Oct 85 (manuscript
received 25 May 84) pp 87-91

[Article by S.M. Abdraimova, B.Kh. Koshkenbayev, V.B. Maksimenko and
Sh.S. Tazhibayev, Institute of Nutrition, USSR Academy of Medical Sciences,
Kazakh Branch, Alma-Ata]

[Abstract] An assessment was conducted on the serum lipid and lipoprotein
status in female August rats (80-100 g) subjected to combined protein and
vitamin deficiency with and without hypokinesia. The animals were maintained

for 60 days on a diet in which the protein was replaced by wheat gluten and which excluded vitamins A, E and C. Animals subjected to protein-vitamin deficiency presented with moderate depression of serum triglyceride lipase and lipoprotein lipase. Subjecting such animals to hypokinesia during the 60-day trial led to further depression of lipoprotein lipase and no further decline in triglyceride lipase. Animals on conventional diet subjected to hypokinesia, responded with a much more profound depression of both enzyme activities than seen in animals in the former experimental group. Animals subjected to hypokinesia, protein-vitamin deficiency, and protein-vitamin deficiency, in-conjunction-with hypokinesia, showed depression of serum concentrations of VLDL, elevation or no change in HDL, and elevation of the LDL fraction in the first two groups and depression in the last group. Analysis of the various cholesterol esters in the serum lipoprotein fractions demonstrated variation in relation to the nutritional status and hypokinesia, as well as an increase in esterified cholesterol. References 21: 1 Ukrainian, 14 Russian, 6 Western.

12172/13046
CSO: 1840/1008

UDC 577.112.6:591.186:599.323.4:599.325.1

PEPTIDERGIC MODULATION OF SLEEP: COMPARATIVE STUDIES ON DSIP ANALOGS

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian Vol 22, No 5, Sep-Oct 86 (manuscript received 28 Jan 85) pp 483-488

[Article by V.M. Kovalzon, F. Obal, Jr, and V.N. Kalikhevich, Institute of Animal Evolutionary Morphology and Ecology imeni A.N. Severtsov, USSR Academy of Sciences, Moscow; Institute of Physiology, Szeged University, Hungary; Chemical Faculty, Leningrad University]

[Abstract] Several analogs of DSIP (delta-sleep-inducing peptide) were tested for their physiological effects in male Wistar rats and chinchilla rabbits following intraventricular injection in a dose of 7 μ g/kg. These peptides were selected because of their greater resistance to degradation by aminopeptidases in comparison with DSIP. Sleep was markedly prolonged by (D-Trp¹)DSIP and (D-Tyr¹)DSIP within 3-5 h in the rats and within 12 h in the rabbits. This change was largely due to extension of slow-wave sleep. The (D-Trp¹)DSIP₁₋₆ analog had no pronounced effect on overall sleep in rabbits, while attenuating the slow-wave sleep within the first 3 h of administration. These observations demonstrated that DSIP derivatives with increased resistance to degradation by proteolytic enzymes may be a promising source of sleep-modulating agents. Figures 3; references 15: 7 Russian, 8 Western.

12172/13046
CSO: 1840/371

INTERACTION OF LEU-ENKEPHALIN AND BRADYKININ AT NEURON LEVEL IN ISOLATED SNAIL (HELIX POMATIA)

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian Vol 22, No 5, Sep-Oct 86 (manuscript received 14 Oct 85) pp 506-507

[Article by G.N. Legostayev, Scientific Research Institute of Normal Physiology imeni P.K. Anokhin, USSR Academy of Medical Sciences, Moscow]

[Abstract] Isolated neurons from the subpharyngeal ganglia of the snail *Helix pomatia* were subjected to microionophoretic administration of leu-enkephalin, bradykinin, or a combination of the two peptides to assess their interaction at that level in the CNS. The electro-physiological studies led to the identification of neurons that responded to either peptide with excitation or inhibition, and a few neurons that responded to both. Furthermore, in some cases, the activity of neurons that responded to one or the other peptide was modified by combined administration of both peptides. These observations point to the experimental utility of such neuronal preparations as model systems for identifying the activities of endogenous opioids, and their putative endogenous antagonists. References 3 (Russian)

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UDC 615.47:621.38:004.58

AUTOMATED MONITORING AND OPTIMIZATION OF ROUTINE EFFICIENCY OF CONTROL PANEL OPERATORS IN INDUSTRY

Kiev VRACHEBNOYE DELO in Russian No 12, Dec 86 (manuscript received 28 Apr 86) pp 95-98

[Article by A.V. Karpenko, Laboratory of Work Physiology of Technical Process Operators, Kiev Scientific Research Institute of Labor Hygiene and Occupational Diseases]

[Abstract] A variety of physiological parameters were monitored to assess factors impinging on work performance of control panel operators responsible for technical processes in terms of latent period for decision-making. In the case of employees at a power station, fluctuations in the galvanic skin response, heart rate and vascular tone were among the most informative of the psychophysiologic indicators, and also indicated the need for a highly individualized approach. Such data may provide the basis for the design of systems that may be useful in evaluating job fitness of control panel operators. In addition, they may also serve to optimize the working conditions and thereby avoid and prevent undue stress. Tables 1; references 8 (Russian).

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CSO: 1840/377

CONTROL SYSTEM MODEL FOR INVOLUNTARY EYE MOVEMENT

Moscow BIOFIZIKA in Russian Vol 31, No 2, Mar-Apr 86 (manuscript received 2 Mar 84; after revision 8 Jul 85) pp 309-312

[Article by V.M. Gusev and N.F. Podvigin, Institute of Physiology imeni I.P. Pavlov, USSR Academy of Sciences, Leningrad]

[Abstract] Eye movements may be voluntary, resulting from programs based on information content, and involuntary, reflexive or automatic. Recent data indicate that visual path structures, such as lateral geniculate body, participate in organization of involuntary eye movements. Models have been developed for automatic eye movement with some questions left unanswered. The goal of the present study was to respond to these questions by solving the reverse task of optimal control theory for evaluation of the quadratic criterion for quality of performance of a control system and characteristics of the input signal. Assuming optimal performance of the control system under study and considering experimental data obtained on eye movement parameters, the parameters of the criterion introduced were estimated as a function of the retinopic relation to individual loci of the lateral geniculate body. Figures 2; references 9: 5 Russian, 4 Western.

7813/13046
CSO: 1840/425

UDC 577.122

BRAIN-SPECIFIC PROTEINS OF S100 GROUP AND NEUROMEDIATOR RECEPTION PROCESSES BY MEMBRANE PREPARATIONS FROM RAT BRAIN

Moscow BIOKHIMIYA in Russian Vol 51, No 10, Oct 86 (manuscript received 7 Jan 86) pp 1708-1713

[Article by M.A. Gruden and A.B. Poletayev, Institute of Normal Physiology imeni P.K. Anokhin, USSR Academy of Medical Sciences, Moscow]

[Abstract] Brain-specific proteins [MSB-mozgospetsificheskiye belki] of S100 groups may participate directly in regulating many membrane, cytoplasmic and nuclear Ca^{++} dependent metabolic processes and thus get involved in manifestations of functional activity of nerve cells. Possible involvement of S100 proteins in specific binding by membrane acetylcholine, serotonin, dopamine, noradrenaline, opiate, benzodiazepine and GAMC receptors of corresponding ligands was studied by isotope-biochemical methods. Specific binding was shown to be modulated by S100 proteins in a dose-dependent fashion; the dissociation constants of receptor-ligand complexes and the number of binding sites were altered by S100 proteins but not by BSA or blood gamma-globulins. These effects were blocked by antibodies to S100. Only the functions of acetylcholine, serotonin, dopamine, noradrenaline and GAMC receptors out of the groups studied were affected by S100 proteins. The mechanism of action for these interactions is still unclear. Several speculative possibilities are presented. Figures 4; references 17: 10 Russian, 7 Western.

7813/13046
CSO: 1840/510

TRENDS IN RURAL DRUG UTILIZATION

Kiev FARMATSEVITYCHNYY ZHURNAL in Ukrainian No 3, May-Jun 86 (manuscript received 16 Jul 85) pp 65-68

[Article by S.V. Chernyavskiy, No 27 Central Rayon Pharmacy, Leningrad Station, Krasnodar Kray]

[Text] Adequate supplies of effective drugs and other medical preparations and supplies are a prerequisite for optimal health care delivery in rural areas. To meet these ends, the rural need for medicines must be clearly defined and effective means of delivery formulated in accordance with demographic trends, morbidity patterns, and displacement of health installations.

In recent years increasing attention has been given to studies assessing drug needs and use, and factors that affect these parameters [1-6]. However, rural requirements for the various pharmacologic agents have not yet been defined.

Our objective has been to assess the trends in rural drug utilization in light of such sociodemographic factors as sex, age, education, family and social status, etc.

This study was conducted in the Leningrad Rayon. An analysis was conducted on drug use by the various age groups in 1982 for comparison with such data obtained in 1976. Regardless of morbidity, each group encompassed 200 persons: 100 men and 100 women.

The study utilized a standard questionnaire which we designed, which provided information on the surname, patronymic, age, sex, home address, educational level, family and social status, family composition, home drug kit, what drugs were used, their pharmacologic designation and dosage form, what drugs were purchased in the course of a year and cost, what drugs went unused and cost, prescription drugs and their cost, nonprescription drugs and their cost, number of visits to a pharmacy and polyclinics in a year.

The participants received six home visits a year for updating of the data. At the end of the year data on discarded and unused drugs were totaled. In addition, data were included on in-hospital drug use. The data were analyzed on a per person and per group basis, average data were calculated, as well as the mean data on drug use per each sick person in each group and for all the participants. The

representative groups consisted of 1600 persons in 1976 and in 1982.

The data on drug frequency use derived for the first time in 1976 and repeated in 1982 demonstrated that in the six year period in question drug use increased by 13.3%. Prescription drugs accounted for 74.7% of the total in 1976, and 81.9% in 1982. The age and sex distribution data for the Leningrad Rayon are summarized in Table 1.

Table 1. Drug Use Statistics on Rural Population in Leningrad Rayon of Krasnodar Kray in 1976 and 1982

Вік (1)	Стать (2)	Витрата медикаментів у рік, крб. (3)		Витрата медикаментів на одного хворого у рік, крб. (4)		Знищено медикаментів (5)			
		1976	1982	1976	1982	крб. (6)	%	крб. (6)	%
(7) 0—9 років	(8) чол.	1628-49	1249-21	16-26	12-49	267-80	8,2	233-88	9,3
	(9) жін.	3267-09	2514-81	16-33	12-57				
10—19	чол.	1638-60	1265-60	16-38	12-65	61-33	8,1	112-49	9,2
	жін.	344-63	592-24	3-44	5-92				
20—29	чол.	757-18	1222-75	3-78	6-11				
	жін.	412-55	630-51	4-12	6-30	36-51	7,8	98-18	9,0
30—39	чол.	221-01	529-33	2-21	5-29				
	жін.	468-05	1090-93	2-34	5-45				
40—49	чол.	247-04	561-55	2-47	5-61	96-68	7,6	172-02	8,9
	жін.	623-07	934-29	6-23	9-34				
50—59	чол.	1272-11	1932-85	6-36	9-66				
	жін.	649-04	988-56	6-49	9-88	160-28	7,2	262-78	8,9
60—69	чол.	1104-09	1457-38	11-04	14-57				
	жін.	2226-22	2952-56	11-13	14-76	184-35	7,0	286-09	8,5
(10) 70 і більше років	чол.	1122-12	1495-18	11-22	14-95				
	жін.	1308-07	1649-22	13-08	16-49	187-33	7,3	280-29	8,6
(11) Усього:	чол.	2642-42	3365-02	13-21	16-82				
	жін.	1334-15	1715-80	13-34	17-15	154-17	7,7	235-12	8,7
	чол.	1206-03	1555-39	12-06	15-55				
	жін.	2566-13	3259-14	12-83	16-29				
	чол.	1360-10	1703-75	13-60	17-03				
	жін.	1067-09	1305-06	9-67	13-05				
	чол.	2002-23	2702-43	10-01	13-51				
	жін.	1035-14	1397-37	10-35	13-97				
	чол.			9-25	11-59				
	жін.	15201-12	19040-49	9-50	11-90	1148-45	7,6	1690-88	9,0
	чол.			9-75	12-20				
	жін.								

Key:

- | | |
|--------------------------------------|-----------------|
| 1. Age | 7. Years |
| 2. Sex | 8. Men |
| 3. Cost, rubles | 9. Women |
| 4. Cost/patients, rubles | 10. 70 and over |
| 5. Discarded/Destroyed drugs, rubles | 11. Total |
| 6. Rubles | |

The data in Table 1 point to an increase in drug use, which is particularly noticeable in the case of women. The frequency of drug use among those under 30 is on the decrease, on the increase among those approaching 60, and then declines

again. The highest level of drug use among men and women occurs in the 50-59 years age group (16 rubles, 82 kopecks), and the lowest is seen in the 20-29 group (5 rubles, 45 kopecks per patient per year). Drug utilization in children 10 and below decreased by 29.3% in the six year period, while increasing in all the other groups. The data in Table 1 also demonstrate that women utilize more drugs than men do; the difference in the various groups ranges from 16 kopecks to 1 ruble and 45 kopecks per patient per year.

In the group of children 10 years and younger those below one year of age accounted for the highest expenditures in 1976 (22 rubles, 87 kopecks). In 1982 the expenditures for this age set amounted to 7 rubles and 3 kopecks.

The frequency of unused drugs was also on the increase. The percentage of drugs discarded in each age group was highest for children 10 and younger (8.2% in 1976, 9.3% in 1982), and the lowest in the 50-59 group (7% in 1976, 8.5% in 1982).

Despite the fact that family size decreased somewhat, drug expenditures per family increased from 35 rubles and 6 kopecks in 1976 to 41 rubles and 65 kopecks in 1982.

Furthermore, the basic tendency is toward increased drug use among men and women in all the social strata. The highest incidence of drug use is seen among office workers (11 rubles, 33 kopecks), and the lowest among collective farmers (8 rubles, 27 kopecks). Individuals with higher educational backgrounds also have a record of higher drug use.

Among the individuals with higher education the trend was more pronounced among women.

The questionnaire also revealed that the most frequent drugs users are widows and widowers, divorced persons, and individuals without families. The lowest incidence of drug use is observed among persons who never married; however, the latter category also consists of the youngest members of the cohort. Married women and men are the groups presenting with the most dramatic rise in drug use (5.3% each). However, in each group women outpaced men.

Many patients purchased drugs on the advice of relatives, friends, neighbors, and acquaintances: such individuals accounted for 11.7% of the purchasers in 1976, and 10.8% in 1982.

In 4.5% of the cases -- 4.2% in 1982 -- the patients followed the recommendations of pharmacists.

In 1976 the number of hospital visits per patient was 4.8 ± 0.2 (excluding stomatological visits), with a figure of 5.9 ± 0.25 for pharmacies; the corresponding data for 1982 were 5.8 ± 0.2 and 6.6 ± 0.2 .

In 1976 22.1% of the patients and their relatives visited a pharmacy once or twice; 39.2% had 3-5 visits; 32.5% had 6-10 visits, and 6.2% had more than 11 visits. In 1982 the corresponding figures were 20.4, 37.8, 31.6 and 10.2%.

A special questionnaire dealt with the acquisition of bandages, patient aids, and the quantity of unused pharmacological agents. Such data are summarized in Table 2.

Table 2. Acquired and Unused Drugs and Supplies

(1) Назва груп лікарських засобів	(24) Придбано в рік, %		Не використано, % (25)	
	1976	1982	1976	1982
(2) Медикаменти, у т. ч.:	86,2	85,1		
(3) антибіотики і сульфаніламідні препарати	18,3	17,2	9,8	10,8
(4) седативні та нейроплегічні	6,2	7,4	6,7	6,9
(5) анальгезуючі, жарознижувальні та проти- запальні	8,8	10,5	8,3	9,2
(6) аналептичні	3,2	2,5	5,3	5,8
(7) снотворні	0,8	0,6	4,5	5,3
(8) серцево-судинні	13,3	12,9	10,2	11,5
(9) жовчогінні і сечогінні	1,8	1,5	3,3	4,3
(10) вітаміни	6,6	6,1	3,1	3,2
(11) гормони	4,3	4,4	5,8	6,7
(12) блювотні та відхаркувальні	1,2	1,1	11,2	12,6
(13) проносні	1,1	0,7	3,7	4,3
(14) подразнювальні	1,9	1,2	5,3	6,2
(15) протикашлеві	3,3	2,9	7,1	7,9
(16) протигрибкові і протисверблячі	1,7	1,5	8,3	9,2
(17) кислоти і луги, солі кальцію і калію	3,2	2,8	4,8	5,6
(18) обволікаючі, в'яжучі та адсорбуючі	0,6	0,3	4,2	5,2
(19) спазмолітичні і гіпотензивні	2,2	2,9	3,8	4,3
(20) інші препарати з різних груп	6,7	8,6	5,3	6,5
(21) предмети догляду за хворими	3,1	3,0	—	—
(22) перев'язочні засоби	7,9	10,8	—	—
(23) лікарська рослинна сировина	1,5	1,5	2,3	3,3
(24) мінеральні води	1,3	—	—	—

Key:

1. Drug or supplies
2. Drugs
3. Antibiotics and sulfanilamides
4. Sedatives and neuroleptics
5. Analgesics, antipyretics and anti-inflammatory agents
6. Analeptics
7. Soporifics
8. Cardiovascular agents
9. Biligenic and diuretic agents
10. Vitamins
11. Hormones
12. Emetics and expectorants
13. Purgatives

13. Stimulants
14. Cough suppressants
15. Antifungal and antipruritic agents
16. Acids and bases, calcium and potassium salts
17. Gauzes, bandages and absorbents
18. Spasmolytics and hypotensive agents
19. Other drugs
20. Patient aids
21. Dressings
22. Unprocessed medicinal plant matter
23. Mineral waters
24. Acquired per year, %
25. Unused, %

The data in Table 2 indicate an increase in the use of analgesics and anti-inflammatory agents (from 8.8% in 1976 to 10.5% in 1982), sedatives and neuroleptics (from 6.2% to 7.4%), as well as diminished use of cough suppressants, soporifics, purgatives, and other preparations. The highest increase among the unused drugs was noted for emetics, expectorants, antibiotics, and sulfanilamides, while that for vitamins was the lowest.

Among the dosage forms not used in 1976 the highest percentage fell to decoctions and broths (12.4%), as well as to solutions, drops and tables (10%). In 1982 the figures were 13.5 and 10.8%, respectively. The reasons for drug underutilization were various: short shelflife, change in appearance on storage, discontinued because of improvement, dispensation of powders and tablets in too large a dosage, and, in the case of antibiotics and sulfanilamides, overprescription.

Conclusions

1. The questionnaire has been found useful in assessing rural drug utilization.
2. Most of the drugs used are represented by prescription drugs (74.7% in 1976, 81.9% in 1982).
3. Drug use is affected by such sociodemographic factors as sex, age, educational level, and family and social status.
4. The question of drug utilization requires further analysis to provide a basis for predicting drug requirements and public health financing.

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12172

CSO: 1840/352

SOVIET EYEGLOSS SERVICES

Moscow PRAVDA in Russian 13 Jan 87 p 3

[Article by E. Avetisov, acting director, Moscow Scientific Research Institute for Eye Diseases imeni Gelmgolts]

[Abstract] This article briefly describes the status of optical prescription, ordering and production in the USSR. Opticians are trained at medical institutes to the intermediate level of medical personnel. Then they are employed partly at clinics and partly at optometrical dispensaries. The author suggests the need for combining glass and frame production in a single plant; currently only sunglasses are made completely at a single location. Moscow--concludes the author--needs to follow Leningrad's example of bringing together the work of ophthalmologists, optometrists and production.

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UDC 615.014.24:614.27

MATERIAL AND TECHNICAL PROVISIONS FOR PREPARATION OF STERILE SOLUTIONS AT PHARMACIES

Kiev FARMATSEVITYCHNYY ZHURNAL in Ukrainian No 4, Jul-Aug 85 (manuscript received 29 Jul 84) pp 61-63

[Article by D.V. Dykun, Lvov State Medical Institute]

[Abstract] A questionnaire-based analysis was conducted on 600 Ukrainian pharmacies supplying various medical institutions with sterile preparations, to assess the conditions and techniques under which such pharmaceutical supplies were prepared and supplied. The collated data revealed that at some pharmacies the degree of automation and the technology employed need considerable improvement. In addition to the need for stricter supervision of such operations and closer monitoring of quality standards, there is a need for designation of specialized pharmacies to meet the clinical demand for sterile solutions. References 7: 1 Ukrainian, 6 Russian.

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PREVENTION AND TREATMENT OF HYPERTENSION AT HEALTH STATION OF TRACTOR PLANT

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 12, Dec 86
(manuscript received 1 Apr 85) pp 58-60

[Article by M.Kh. Yuldasheva, docent, and Ye.S. Stavinskiy, Tashkent Order of the Red Banner of Labor Institute for the Advanced Training of Physicians; Health Station (Medsanchast) of Tractor Plant]

[Abstract] Monitoring studies were conducted on 151 male and female patients with hypertension employed at a tractor plant to assess the effects of various treatment and prevention modalities on sick days. The data for 1980 and 1983 pointed to the advantages of using a combined approach to hypertension encompassing drug therapy and regular visits to a sanatorium. On the basis of 100 workers, the case load of hypertension decreased from 54.1 cases in 1980 to 30.6 cases in 1983, while, on the same basis, sick days due to hypertension decreased from 1,089.4 days to 461.3 days, respectively. These observations point to the need for sanatoria, in addition to the health stations, at plants with excessive morbidity.

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RADIATION BIOLOGY

UDC 591.1

COMPARATIVE EVALUATION OF METHODS FOR TESTING PHYSICAL CAPACITY FOR WORK OF IRRADIATED ANIMALS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA BIOLOGICHESKAYA in Russian
No 4, Jul-Aug 86 (manuscript received 7 Aug 84) pp 577-583

[Article by N.I. Arlashchenko, D.Ya. Oparina, Zh.G. Adamchik and V.I. Shein,
Institute of Biomedical Problems, USSR Ministry of Health, Moscow]

[Abstract] A variety of conventional methods were assessed on a comparative basis to reflect physical fatigue in irradiated animals. The study was conducted with outbred male and female rats and CBA male mice subjected to 5, 7.5 or 10 Gy gamma-irradiation. The animals were then tested for physical endurance in running tests, static load bearing, and swimming. On the basis of regression equations the data demonstrated that assessment of the swimming speed over defined distances provided the most telling indication of physical fatigue. Swimming involved the fullest utilization of all available physiological reserves in a life-or-death situation, and therefore represented the best assessment of physical endurance. Figures 2; references 24: 20 Russian, 4 Western.

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CHERNOBYL EXPERIENCE AND RADIOLOGICAL MEDICINE

Moscow IZVESTIYA in Russian 16 Sep 86 p 3

[Article by S. Tsikora, Special IZVESTIYA correspondent, Kiev]

[Abstract] The All-Union Scientific Center for Radiological Medicine, established in Kiev in direct response to the Chernobyl tragedy, is based on institutes of epidemiology and prevention of radiation trauma, experimental radiology, and clinical radiology, which already were in operation in Kiev prior to the nuclear accident. The Center's charge is to determine the effects of lesser amounts of radiation. Early studies have suggested that a radiation dosage of as much as 1,000 times the normal "biological x-ray equivalent" (BXE) would have no genetic effect on the children of a woman so

exposed. The author hypothesizes some innate defensive mechanisms triggered by increased radiation levels. Study of radioactive iodine and cesium particularly in the thyroid gland, is underway for persons exposed in the Chernobyl area. The author asserts that no disturbing consequences have been observed in children subjected to high-level radiation during the incident. Advanced detection and research equipment is being acquired by the Center for ongoing research in radiology. While the author very positively projects that there will be no subsequent radiation illnesses, he stresses that research will continue to raise the general level of medical assistance available in Kiev, Gomel and Zhitomir oblasts.

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CONFERENCES

LEIPZIG SYMPOSIUM ON BIOTECHNOLOGY: PROBLEMS AND PROSPECTS FOR STUDY OF ANTIPHYTOVIRAL COMPOUNDS

Kiev MIKROBIOLOGICHESKIY ZHURNAL in Russian Vol 47, No 4, Jul-Aug 85
pp 108-110

[Article by A.G. Kovalenko]

[Abstract] A symposium on biotechnology--organized by, among other East German institutions, the Section of Biological Sciences of Leipzig Karl Marx University--was held 10-14 Sep 84 in Leipzig. The major theme of the symposium was phages in industrial microbiology. A special discussion of "The Search for Antiphytoviral Compounds" was held. Representatives of the USSR, Bulgaria, Hungary, Czechoslovakia, Poland, Cuba, West Germany, Great Britain, France, India, Brazil and other nations participated. A.D. Bobyr of the USSR shared the experience of Soviet scientists in the study of phytopathogenic viral inhibitors, indicating the advantages and difficulties of chemical methods of plant viral infection control. He discussed the major regularities and principles of directed search for antiviral preparations, means for overcoming phytotoxicity and reversibility of the effect of inhibitors as factors preventing their practical utilization in agriculture.

6508/13046
CSO: 1840/282

MISCELLANEOUS

GEORGIAN SSR SCIENCE COOPERATION WITH WEST GERMANY AND HUNGARY ECONOMIC
TIES OUTLINED

Tbilisi ZARYA VOSTOKA in Russian 7 Nov 86 p 4

[Article by Zaur Kruashvili, general director, "Analitpribor" Scientific
Production Association, corresponding member, GSSR Academy of Sciences]

[Abstract] The article reports on a cooperative arrangement between "Labtest
Equipment" of West Germany and Soviet Georgian partners to develop highly
sensitive spectral analysis equipment for testing liquid samples by inductively
bound plasma (IBP) techniques. The proposed equipment will test a wide range
of substances quickly, accurately and at low cost. The Georgian Association
will produce optical equipment, while "Labtest Equipment" will provide high-
quality IBP generators and atomizers. A second instance of cooperation is
reported by Georgiy Kvesitadze, deputy director of the Institute of Plant
Biochemistry, GSSR Academy of Sciences. He tells of cooperation with the
Hungarian firm "Reanal," through Dr Bela Sayany, for production and sharing
of enzymes such as glucoamilase (from the Georgian institute). Previously,
the Hungarian firm had purchased this product from the Danish firm "Novo."
The Hungarians are providing chiefly scientific experience and advice.

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